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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

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PUBLIC INFORMATION MEETING

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SPENT FUEL TRANSPORTATION CASK TEST

PROTOCOL WORKSHOP

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THURSDAY

MARCH 13, 2003

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PAHRUMP, NEVADA

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The Public Meeting was called to order at  
the Convention Hall, Mountain View Casino and Bowling,  
1750 Pahrump Valley Boulevard, Pahrump Nevada, at 6:04  
p.m., by F.X. "Chip" Cameron, Facilitator, presiding.

PARTICIPANTS:

E. WILLIAM BRACH, NRC

ROB LEWIS, NRC

ANDREW MURPHY, NRC

KEN SORENSON, Sandia National Laboratories

AMY SNIDER, NRC

## I-N-D-E-X

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P-R-O-C-E-E-D-I-N-G-S

(6:04 p.m.)

FACILITATOR CAMERON: If we could have everybody get seated, we will get started with tonight's meeting. Good evening, everyone. My name is Chip Cameron, and I am the Special Counsel for Public Liaison at the Nuclear Regulatory Commission, and I wanted to welcome you to the NRC public meeting tonight.

And the topic tonight is the NRC plan to do full-scale testing of spent fuel transportation casks. And it is my pleasure to serve as your facilitator tonight, and to help all of you have a productive meeting.

And I would have to say that it is nice to be in Nye County, and nice to be in Pahrump. We have had a lot of good interactions here on these issues in the past, and we look forward to it tonight.

One question though is why isn't Sally Devlin with us tonight? No, thanks, Sally. I just wanted to say a couple of things about the meeting process before we get into the substance of the discussion, and what I would like to do is just briefly talk about why the NRC, the Nuclear Regulatory Commission, is here tonight.

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And what the format and ground rules for the meeting are going to be, and to go over the agenda for you so that you have an idea of what to expect tonight. In terms of purpose, we want to clearly explain what our plan is to conduct full-scale testing.

And also to explain what the NRC's role is in the transportation of spent nuclear fuel. And also to fill you in on what the responsibilities of other agencies are. So we want to clearly explain that to you and the second purpose, and more important purpose I suppose, is to listen to any comments, concerns, recommendations, that you might have about this proposed plan to do full-scale testing, or any other transportation issues that you want to get into.

In terms of the format, it is pretty simple. We are just in a townhall format tonight, and we are going to have some brief presentations for you by the NRC and our expert consultants who are here. And basically then go out to you for any questions or any comments that you have.

We are taking a transcript of the meeting tonight, and that will be available on the NRC website and we probably can also get you a hard copy of that if you want it.

But because we are taking a transcript, if

you do have anything that you want to say, just signal me, and I will bring this microphone to you, and please tell us your name, and affiliation, if that is appropriate.

And we will get you on record, and listen to your comment, and try to answer your questions. And I would ask that we only have one person at a time speaking, not only so we can get a clean transcript for you all to look at, but also so that we can give our full attention to whomever has the floor at the time.

And try to be concise in your comments. We have a lot of people here, and I know that there is a lot of aspects to these transportation issues to talk about. So try to be brief. I know that can be difficult with these types of issues, but that will help us to ensure that everybody has a chance to talk tonight, and that is one of our goals, is to make sure that we give everyone an opportunity to speak.

And in terms of the agenda, it is going to be real simple tonight. We are going to have an introduction, a welcome by the senior NRC manager, the director of the Spent Fuel Project Office, and that is Mr. Bill Brach, who is right here. He is going to formally welcome you.

And then we are going to go to Mr. Rob

Lewis, who is over here, who is the Chief of the Transportation Section in Bill's office, Spent Fuel Project Office, and Rob is going to talk a little bit -- and we don't want to kill you with long presentations, but he is going to talk about the NRC's role and responsibilities, and some of the background on this testing program that we are thinking about.

And then we are going to go to Mr. Ken Sorenson, from Sandia Labs, who is here. He is one of the experts that is helping us with these transportation studies, and he is going to go into a little bit more detail on the plan, the draft plan, and what is called the draft test protocol.

And then we have Mr. Andy Murphy, who is from our Office of Nuclear Regulatory Research. He is going to tell you about some of the issues that we are interested in hearing from the public on.

And then we are just going to go out to you for any questions that you might have. And we thank you all for being here tonight, and we hope that we can give you the information that you need, and we are also grateful for the comments that we are going to hear tonight.

And I just want to say that it is nice to have the Chairman of the Nye County Commission, Mr.

Henry Neff, here, and also another Commissioner, Candice Trummel, is with us tonight.

So that is great, and we really appreciate that attention. I want to just introduce people a little bit more so that you know what their backgrounds are, and then we will get started.

And I think what I will do is perhaps -- well, maybe I will introduce them as they get up. And I wanted to make sure that you know that Amy Snyder, who is in the Spent Fuel Project Office, and she is the project manager from the Spent Fuel Project Office for this particular study.

So she is a key person on this, and Andy Murphy is the project manager from the Office of Research, because this is a research project. And I will get to those introductions in a minute.

Bill Brach has been with the NRC and the Atomic Energy Commission before that for about 30 years, involved as a manager in all aspects of the Commission activity, and his latest assignment is being the Director of the Spent Fuel Project Office.

And he has been doing that for the last four years. And, Bill, could you just give everybody a welcome.

MR. BRACH: Chip, thank you very much. On



behalf of the NRC, first, let me clearly welcome you to the meeting tonight. As Chip mentioned, our office is the Spent Fuel Project Office at the NRC, and has the responsibility for not only licensing the interim storage of spent fuel, but also the responsibility for licensing certification of transportation activities, and the certification of transportation packages that are used to transport radioactive materials.

And that includes the transport of spent nuclear fuel. Now, the meeting tonight, this is not our first time to Pahrump as Chip has mentioned. This is the third in a series of meetings that we have held with stakeholders, with the public, on the package performance study.

I have been here before and I can tell you from personal experience that you will find the input very, very useful, and the forum for this meeting very, very constructive to dialogue and interaction.

So I look forward very much to our interactions tonight. We are here to listen to your views, your comments, on the topics that we will be discussing with you with regard to the package performance study, and considerations for testing.

So again, welcome, and I look forward to dialoguing and hearing your views and comments on the

package performance study that we will be discussing with you this evening. Thank you.

FACILITATOR CAMERON: Okay. Thanks, Bill.

And now Rob Lewis is going to give us some perspectives on our NRC responsibilities, and I mentioned, he is the Chief of the Transportation Section. And he has been personally out here before to talk about transportation issues with you.

He has a Masters degree in Engineering from the University of Arizona, and a Bachelors in Physics from the State University of New York. And, Rob, I will turn this over to you.

MR. LEWIS: Thank you, Chip. Thank you, everyone, for coming out, and I would echo Chip and Bill's comments, and thank you to the Commissioners for being here as well.

I wanted to talk tonight about -- to give you a little introduction about who we are and what we do, and how the transportation process works. Some of what the different agencies that are involved in transportation of spent fuel, and what they do.

I also wanted to talk a little bit about what we have done at the NRC since the tragedy of 9/11, because I am sure that everyone is interested in that.

And I can't talk a lot about that, but I can tell you

a little bit in terms of how the agency responded and what we are doing.

And the reason that we are all here tonight is to talk about cask testing, and I will describe a little bit of the transportation studies that we have done at the NRC, and then conclude, and turn it over to Dr. Sorenson from Sandia Labs, who did a lot of the work on the test protocols document which describes the full-scale test that we propose.

I want to start with the Department of Transportation, because along with the NRC, that is the other main Federal agency that has responsibility for regulation of transportation of all radioactive materials.

We have Mr. Rick Boyle from the Department of Transportation in the audience tonight, and he is a counterpart of myself, and we work very closely together. The Department of Transportation of course regulates all aspects of hazardous materials.

Radioactive material is one of several classes of hazardous materials, and other hazardous materials that are transported are gasoline, which is the most common thing; and chlorine, and many types of hazardous materials are transported every day around the country by rail, and by highway, and by air.

DOT is the agency that has the primary responsibility for regulation in general, but some of the things that they do that touch on spent fuel transportation safety include the hazard communications.

And what that means is that those are the placards that are on the trucks to make sure that when a first responder, a local fire department person, or a local police department arrives at the scene of an accident, they can quickly identify the hazardous materials on board.

And to take actions in accordance with their training, and cordon off the area if they need to call for help, and call for help from the local HAZMAT team, or even in some cases call for help from the Federal Government if the event rises to that level.

For spent fuel the DOT also sets the rules for routing of spent fuel for highways. The spent fuel is material that needs to be shipped primarily on interstate highways, and around cities, by using the bypasses, the interstate bypasses around cities whenever it is possible.

Also, the material has to be forwarded as soon as possible, and so try to keep it in motion across the country. And DOT sets the rules. The

States, by the way, also get involved, and the States, knowing their local areas, can set alternate routes using arguments that might include the relative safety of alternate routes compared to the preferred route, which would be the interstate.

An important part of radioactive material transportation is that it is really an international business. Spent fuel, of course, is the most glamorous if you will type of radioactive material.

It is a very high hazard and needs to be securely contained in the casks, but there are many, many types of radioactive materials that are transported, such as nuclear medicine equipment for hospitals, material to x-ray wells, for example.

There are many, many shipments of radioactive material, and shipments throughout the world, and they cross borders. So the DOT, and the NRC, both work with the Atomic Energy Agency, the International Atomic Energy Agency, which is the IAEA -- and you probably heard in the news lately that they are very heavily involved in the weapons inspection activities in Iraq.

And Dr. El Bareda is the head of the IAEA.

He is always on CNN lately. We go over there about three times a year to Vienna, Austria, to meet with the

IAEA and talk about transportation safety.

The Nuclear Regulatory Commission. Of course, the Nuclear Regulatory Commission is an agency that has licensing, inspection, and enforcement authority given to us by the Congress in the late '70s, and our predecessor agency, the Atomic Energy Commission, started in the late '50s, the early '50s.

And we regulate nuclear power plants, and nuclear medicine departments, and we would license Yucca Mountain, and for transportation, we have a very narrow role, in that we certify the casks.

And DOE, if they were to make shipments to Yucca Mountain, if they were to get a license from us, would need to use only NRC certified casks to make those transports.

The thing about the NRC that I wanted to say, too, is that we are independently focused on safety. Our main mission is safety and protection of human health, and the environment.

And we don't try to make design changes to casks for economic reasons, or to try to maximize the payload. We only look at the safety of the casks from that angle, and we do an independent review as well.

So we certify the casks as accident resistant, and how the process works is that a private

company will design a cask, and compile all the documentation and engineering drawings for that cask.

And they submit that material to the NRC before any cask is ever built.

And we do an independent safety review with our engineers. We have many types of structural engineers, materials scientists, and nuclear engineers. They look at things like radiation safety.

And after our independent review, if we are satisfied that the cask meets our regulations and would provide adequate safety in accidents, then we certify the cask.

And what that means is that the cask design has an NRC approval, and then the owner of that private company that originally submitted it can build the cask at that point as long as they meet the conditions that we specified in the certifications.

We also have a quality assurance role, which I will talk to you about in one second. The second function of the NRC for spent fuel transportation casks is that we go out and do inspections, and that is my section.

I am in charge of the group that does these inspections, and we have one of our inspectors with us tonight, Mr. Robert Temps (phonetic), over by

the door helping us out with the sign-in sheets, and we inspect several aspects.

We inspect the designers of the cask, the private company that had the paperwork prepared that describes the casks, and we go out and do inspections of how they maintain the paperwork, and that is called QA, quality assurance, to make sure that all the records are available so that they can ensure that the design in the casks that they are building is what the NRC originally approved.

Now, we inspect the fabricators, the actual factories that put the casks together and roll the steel, and assemble the casks, and build the bolts, and everything.

We inspect the fabricators for that, and in addition when the nuclear power plants make the shipments -- and I should stress that the NRC doesn't own any radioactive material, and we don't make any shipments, but that we go and look at the utilities, the nuclear power plants that would be making the shipments.

Or the DOE, or the DOE contractors that would be making the shipments. We come in and do an independent inspection and audit of their activities.

And each of these types of entities are



required to have QA programs, which the NRC also approves those. And once again the QA program is for us to make sure that what they say they are doing is what they are doing.

The final thing that I wanted to talk about in terms of the NRC's role, is that we set rules for protection against theft and sabotage, and the focus on that is prevention and constant vigilance, and detection of attempts of sabotage, and the response if sabotage were to occur.

And in the case of spent fuel, we have requirements that specify that armed escorts are required, and that the trucks that carry the casks must have immobilization devices, and that if they were to come under attack from a terrorist or someone trying to sabotage it, that they can immobilize the truck and it is like a dead-man switch. The engine won't work and you can't move it because gas is very heavy.

And also the trucks have to have constant communications with the headquarters center as well.

As I already spoke a little bit about, we go out and enforce and inspect these requirements.

The NRC also inspects for the DOT regulations, and we work together with the DOT when we make a finding of a violation of transportation

regulations.

And very quickly, and we are a little bit out of sequence on your slides, but I will cover all the slides, and I am trying to move through these a little bit quickly so that we can get back to the discussion.

But I just very quickly wanted to set the stage for the next couple of slides. When we certify casks, we look at routine transport conditions, accident conditions and sabotage type conditions.

The cask. What a cask looks like, and I mentioned routine transport conditions, but this is the cross-section of a cask. And you will see that right in the center of this cask would be the spent fuel, and a truck cask might have maybe two tons of spent fuel, and a rail cask might have about 12 tons of spent fuel.

And the cask itself, the truck cask, might weigh 40 tons, and a rail cask might weigh 120 tons.

So the amount of spent fuel in a cask is a very small fraction of the total weight, and that's because there is very heavy shielding and steel layers around the spent fuel.

You can see here that this layer is a thick shield of lead, which stops gamma rays and gamma rays are like x-rays. It reduces the amount of

radiation that emanates through the walls of the cask, and that is not a release of radiation, but as you think of an x-ray, it goes through the material, and a gamma ray behaves very similarly.

So in the normal condition of transport that I talked about, we regulate the amount of radiation that goes through the cask, and exits, and in accident conditions we also have limits for the amount of radiation that can go through the cask.

In addition, we have limits, very tight limits, on the amount of radioactivity that could ever be released. And when I say released, once again it is not coming through the cask flaw of the radiation, but the actual radioactive material inside would be trying to get out, and we don't allow that.

A picture of a cask, and you don't have this, and so I apologize, but it wouldn't look very good on a small slide anyway. But this is the picture of a rail cask on a railroad car, and the cask sits here on a carrying cradle, and it has these tie downs as well.

And this cask is very similar to the cask that we are talking about in the package performance study that we are going to be talking about in a little bit. This cask would weigh about 140 tons fully

loaded, not including the rail car.

AUDIENCE QUESTION: Is that the company that makes that?

MR. LEWIS: Yes, that is one of the private companies that makes casks. There is about 4 or 5 different companies that make cask designs, and this is just one example of the types of them.

And 9/11 really changed everything at the NRC. We were very busy right after the events, and of course everybody knows that nuclear power plants were one of the things that people thought were a target.

And we fully staffed up our emergency operations center, and all of us worked very long hours to respond to the evolving terrorism threats, especially in the early days right after the events.

We required all our licensees of spent fuel storage facilities, and people that transport spent fuels, nuclear power plants, and even smaller licensees, to go to the highest level of security, and that means different things for different people.

But just rest assured that everybody upped their security level. And we worked -- the safeguards assessment team is a senior management team at the NRC, looking at what is the best thing to do in order to ensure protection of people against the possible

threats that might be occurring.

We worked very closely with the FBI, the CIA, and other agencies to define the possible threats, and we are still working very closely with them to this day. And I say that it changed everything. The entire NRC reorganized right after -- about a year ago actually.

We reorganized and we have an entire office right now that does nothing but look at security and protection from terrorists. That office has taken one of the responsibilities of the spent fuel project office, and that was approval from a security standpoint for spent fuel transportation routes.

And that office has taken that from us, along with the other security things that they do. Now, specifically what we have done since 9/11 is that we have issued several advisories to our licensees. We have a very fast mechanism to get information out so that everybody is on the same page.

We issued several advisories to the different classes of licensees after we found out new information, and then we also had issued what is called interim compensatory measures and orders.

Now, what that is, is that an order is an NRC tool that we can send to a licensee, and it says

that you have to do the following. We are ordering you to do this. And if you don't, significant enforcement will occur against you, up to and including shutting everything down and taking over if we need to.

But the interim compensatory measures were along the same lines. They were our advice on what types of things people should be doing to provide enhanced security during the higher threat environment to their activities.

Interim is the word used because we are currently performing several studies to look at what types of things we can do in terms of long term rules to coordinate our activities like with the Office of Homeland Security's color-coded system, the yellow code, orange, and things like that.

So in the interim, and until we get the long term rules in place, we have compensatory measures and orders to enforce them. I should say that 9/11 did not stop transportation of radioactive material. It is still occurring.

Now, I wanted to quickly talk about the fact that we have a very favorable history that we are very proud of in terms of spent fuel transportation.

There has been about 1,300 shipments of spent fuel in NRC certified casks in the last 20 to 25 years.

Now, that is an NRC certified cask, and you have heard similar talks and people use different numbers because there are other casks that have been shipped that were not NRC certified casks.

DOE could have their own casks that they certify, for example, but not for Yucca Mountain. Only NRC casks could be used for Yucca Mountain. We have never had to our knowledge any injury attributable to the radioactive material that is being shipped, or any release of radioactive material in those 1,300 shipments, and we are proud of that.

And the last bullet is not about spent fuel, but just to give you a perspective, 1,300 spent fuel shipments in 20 years; but using the same basic regulations, the casks are much more rigorous, but the normal conditions of transport and the QA programs that we apply and everything else, are very similar.

And about more than 3 million shipments a year, and that is 10,000 a day, occur of radioactive material. So that is about one percent or so of all the hazardous material shipments. Most of that again is radiopharmacy equipment, material that is used in nuclear medicine departments in hospitals.

We often do transportation studies, even though we have a very good safety record, and we have

decided actually that to be prudent that we need to have continued attention always to the evolving issues in transportation, and the best available technology to analyze the risks to people.

We have done three major transportation risk studies in the last 20 years, and the fourth one we are here to talk about tonight is the package performance study.

The risk studies have always confirmed our confidence in our regulations, and so we have a very safe set of regulations, and that the risks to the public of allowing the transport are low.

The package performance study, I have a specific slide that is not in your handouts, which I will talk about now. I have been out here to talk to you kind people many times about the package performance study over the last couple of years, and we are here to talk tonight because we have made a major step forward in that study.

We have published what is called the package performance study test protocols. We can out in 1999 and polled people on what would you like us to study in terms of transportation tests that we could do.

We took the information back and produced



what was called the issues report, and then we came back out here again and asked did we capture your issue correctly, and is there any new issues that you might have, and that was in the year 2000 that we came out for the second time.

About 2000, we switched from the phrase of what should we do, to here is what we propose to do, and that is why we are here tonight to talk about the proposed tests that the NRC thinks would contribute to public confidence in the safety of what we do.

And also to provide some technical information in terms of our ability to use computer models to successfully predict how casks might behave, regardless of any type of accident that they might be in.

And at this point, I will turn it over to Dr. Sorenson, who will talk -- well, one second. He has got a couple of slides on what are the actual test proposals, and I will turn it over to Chip, and I am happy to take questions now or after that.

FACILITATOR CAMERON: Why don't we -- I promise that we won't get into a whole lot of material, but let's hear the specifics, and then we will have it all out in front of you, and then we will go for questions.

And Ken Sorenson is from Sandia National Lab, and he is going to provide you with a little bit more specific information about this draft test protocol that we have, and he is the manager of the transportation and packaging department at Sandia.

He has been involved for 15 years in looking at spent fuel transportation casks, doing risk assessments on them. He is the chair of the package and transport division of the Institute of Nuclear Materials Management.

And he is also on the editorial board of a journal, an international journal, that focuses on spent fuel transportation issues, and that is the Journal of Transportation of Nuclear Material Packages.

He has a Bachelors degree in Civil Engineering, and a Masters degree in Civil Engineering from Colorado State University, and also a Masters in Business Administration from the University of New Mexico.

And, Ken, and then we have one more really short presentation after Ken, and we will go out to you for questions.

MR. SORENSON: Thanks, Chip, and good evening everybody. I want to thank Rob for the promotion. Actually, if you listen to the byline, I am

not a doctor. I have a Masters degree in Engineering, but I appreciate that.

As I said, it is a pleasure to be here tonight. Sandia is the technical support organization for the NRC on the package performance study, and so the analyses that you see in the protocols were done at Sandia National Laboratories.

The presentation that I am going to give you tonight is really a version of the hard copies that you have, and I am going to start on slide number five, and the first four slides give a little bit of background.

But what I would like to do is just show you some snapshots of some of the analysis that were done in the protocols to maybe stimulate your thinking a little bit so that you could ask some questions, or stimulate some discussion maybe on what is in the protocols.

This first slide is three bullets on really what the protocols are all about. The first thing we want to do is to identify some candidate casks that could be used for these tests, and in the protocols there is a rail cask that is identified there, the Holtec Hi Star 100 rail cask, and there is also the GA-4 truck cask that is identified in there.

It is important to remember that these are just candidate casks that have been suggested. The final cask that will be used is under discussion and that is one of the things that we want to talk about; which are the most appropriate casks for these types of tests.

Secondly, we are describing concepts if you will for the impacts in the fire test. What types of impact tests and what types of fire tests are we considering.

And again as a means to stimulate some discussion from the public at these meetings, and to see what are the best ways to do these tests with these particular casks.

And also you see in the protocols preliminary computer analyses that provide a snapshot if you will of the type of response that these casks will be undergoing for these specific types of tests that are in the protocols.

And then thirdly the protocols are really designed again to solicit public comment and discussion. This is the third meeting that we have had. Last week, we were at the NRC headquarters, and last night in Las Vegas, and then we had some really or very good input and feedback on these protocols.

And so we look for that from you all tonight as well. I think it is important also to recognize what these protocols are not. They are not a prescription document that says that these will be the tests that will be done, and these are the casks that will be used.

It really is a vehicle if you will to put some ideas on the table to discuss the best way to handle these tests, and that is really what the intent of the protocols are.

This first picture here is a picture of an analysis, a computer analysis on the left-hand side here, and this is the Holtec Hi Star 100 cask. And this is what we call a center of gravity over corner impact.

And if you will, if this is the cask, and it is going over target, the center of gravity is right over the corner of the cask. So that is what we call center of gravity over target.

And it is on the closure side and that really is a vulnerable sort of orientation for the cask and so that is how we chose that particular analysis to show you here.

This big pink area here is what is called the impact limiter and it was redefined in Las Vegas

yesterday as a shock absorber, and that absorbs a lot of the energy that is developed during the drop test and any impact, as opposed to having the cask having to absorb it.

The graph here on the right shows a plot of the G-forces that are going into that cask as a function of time here on the bottom. And you can see the total G-force that is going into that cask is about 100-G's.

And by way of comparison, we did an analysis for a regulatory 9 meter drop for that same cask, and the same orientation, and the G-loading that was developed for that particular test is about 30-G's.

So for this particular cask design at that speed of 75 miles per hour, and that orientation, the loading on that cask really is a severe type loading relative to the regulatory 9-meter drop test.

So again this is a snapshot of how this candidate cask would perform in this severe type of loading for a 75 mile per hour drop, drop speed, and it is one of the items for discussion.

AUDIENCE: How was it dropped, vertically or horizontally?

MR. SORENSON: That was dropped vertically. The question was how was it dropped,

vertically or horizontally, and it was vertically. That is a good question.

And just to make sure. This is only by analysis. We have not actually done the drop. This is only by analysis. This second analysis that we showed here is an analysis of the GA-4 truck cask, and this is what we call this back breaker orientation for the analysis.

And actually this came out of some of the public feedback that we got a couple of years ago, and one of the concerns was what happens if you have a transportation accident where the impact limiters are bypassed and you actually have the direct impact on the cask body, as opposed on to these shock absorbers. And how serious is that.

And so the simulation here or the scenario is that the cask is running into like a bridge abutment, and it completely bypasses the impact limiters.

And using the analysis in this picture, we do not actually add the impact limiters on to the ends of the cask. The mass is modeled in there and so you have the right mass, but we just don't show the impact limiters.

But you can see that again that this is at

75 miles per hour, and it is a pretty hard impact, and it has actually quite a lot of deflection for that particular cask.

The G-loadings for this cask shown down here peaks at about 150, and has kind of if you will a steady state G-loading of about 100-G's, 110-G's. So again this is an idea, a candidate type of test to do for a truck cask.

And with a proposed 75 miles per hour, and this comes right out of the test protocols. And then finally I will just show you some analyses, thermal analyses that we did for the pool fire test. The regulatory test is an open pool fire test for 30 minutes at one meter above the level of the fuel.

And to look at how the casks respond in these pool fires, we looked at it in different orientations. The bottom picture here shows the cask at the pool level, the fuel level of the pool.

The middle picture here is the cask at one meter above the pool, and then the top picture is 3 meters above the pool. And what we are looking at in this relatively dark area here is what is called the vapor dome.

And that is where you don't have complete combustion of the fuel mixture, because you have a lack



of oxygen in there. So you have relatively cool temperatures underneath the surface of the cask.

And so we were looking at one point elevation wise do you get above that vapor dome, and you have relatively higher temperatures under the cask like you do on the sides and the top.

This picture here is a picture of the Hi Star 100 rail cask, and that particular picture is -- this particular analysis is one meter above the full surface.

And this plots the temperatures on the surface of the cask. So you can see the bottom of the cask has relatively cool temperatures, again because of this vapor dome area here. So that gives you a plot, and that gives us an idea of what sort of temperatures the cask is going to be seeing during these severe fire tests. And the plot here --

AUDIENCE: What type of fuel?

MR. SORENSON: The question was what type of fuel, and it is jet fuel, I believe.

FACILITATOR CAMERON: If you could just try to hold your questions so we can get you on the transcript when you do have a question. We will be done in a few minutes and we can go back to these slides, because I know it is a lot to ask you to

remember.

MR. SORENSON: And just to show you how we look at these analytically, these different tests and analyses, and again this is all analysis, but here is a plot of temperature on different portions of the cask surface relative to time.

We happened to take this analysis out for an hour, and again these are suggestions or proposals that we put in the protocols document to have reviewed by the public so that we could get feedback on the best way to proceed on these thermal tests and the impact tests. So that is all I have, Chip, and I will turn it over to Andy at this point.

FACILITATOR CAMERON: Okay. Thanks, Ken, and we have Andy Murphy, from our Office of Nuclear Regulatory Research, and he is the project manager on this study.

And he is going to talk about major issues for us, and just to give you an idea about his background. He has been with the NRC for about 24 years working on seismic earth science and structural engineering issues.

And notably in a lot of the work that Andy has done with the Commission, he has managed large scale testing programs for things like reactor

components, and systems. So he is particularly qualified to manage this testing program.

And before he came to the NRC, he was at the Lamont Doherty Earth Observatory, which is connected to Columbia University in New York City, and he has a Bachelors in Geophysical Engineering, and a Graduate Degree in Seismology. And with that, Andy.

DR. MURPHY: Good evening. I would like to as was said earlier, keep up some of the discussion on the technical issues associated with the test protocols. I have got a number of issues identified up here, seven, as part of the document that we put out for public comment, issued a number of specific questions that we would like to focus your attention on.

There were 11 questions in the document, and obviously we are very interested in your comments on anything that is of concern to you. There were 11 issues that were identified there, and those were issues that came to our attention as our thoughts that were appropriate for comment.

The first line, if you can see them from all sides, are the cask designs and how many casks. In the protocols, we have proposed two designs; a rail cask, one produced by Holtec Industries; and a truck

cask, the GA-4, produced by General Atomic.

We have done our preliminary calculations as Ken has just indicated for those two casks, and they are published in the document. The other part of that question is obviously we picked the two to start with, and what is the right number.

I know that there are some folks that are very interested in having any of the casks that are used to transport materials to Yucca Mountain to be tested, and if we drop down to the fourth question, the issue of testing full-scale or partial-scale casks.

We have proposed in our document full-scale testing, or full-sized actual casks in this program. The second item up there was the orientation or the type of tests. When we looked at this, we normally had two types of casks testing available to us.

The first one was to put it on a rocket sled and to propel it horizontally into an unyielding target, or to drop it from a tower on to an unyielding target.

We have proposed to use the tower configuration and drop it, because it is a lot easier for us to control in an engineering sense. If you have got a rocket and you light that rocket off, it does

have a little bit of a mind of its own, and just how much power there is in there, and how fast it is going.

And it is important to us to have an idea of how fast it is going, because that is an important parameter in the analyses that we are doing. And we are in a position that we are wanting to do or planning to do predictive analysis obviously before the test happens.

And we will publish our predictions as to what is going to happen to the casks, and produce the uncertainty or the limits on those predictions. An important item that has come up in the last two meetings is not up on this slide, because we have not thought about it, and that is should we be testing to failure.

There has been considerable comment in the last two meetings that we consider testing to failure.

It is an issue that was not in our initial program, but given the attention that it has gotten like I said in the last two meetings, it is something that should be considered.

The item there, type the number of surrogate fuels. These casks are meant to carry spent fuel assemblies. We do not plan to test with real fuel in them, but we are planning to put in surrogate fuel

assemblies.

At this stage, we are proposing to put one fuel assembly in each of the two types of casks. The rail cask would carry 24 pressurized water reactor fuel assemblies, and we are proposing to have one surrogate fuel assembly in there.

This would be an assembly that basically looks nearly identical to the actual spent fuel assembly, except that we would not have the spent fuel in it. We would have another material, a non-radioactive material, in there to simulate the fuel.

The other 23 assembly locations in that cask would have dummy fuel assemblies. This would simply be weight and mass substitutes. They would not look like a fuel assembly. They would just be weights and mass.

And for the truck casks for General Atomic, that holds four assemblies, and one of those would be a surrogate, and the other three would be dummies. That covers the impact tests and the real question about scales.

The second to the last item up there is the duration of the fire tests. The certification tests for the United States, the limit on that is a half-an-hour. We are proposing that the tests for the

package protocol, or package performance protocols would be greater than a half-an-hour.

The other item up there for questions is the position of the cask relative to the fire. Ken showed you three different positions that are possible.

There are actually more. And we are asking for comment on the placement of the cask in the fire. And so that takes care of my comments, and I will pass it back to Chip.

FACILITATOR CAMERON: Thank you very much, Andy. Well, you have heard from -- we have gone from what the responsibilities are to the details of cask testing, and now it is time for us to listen to you, and hear your comments and try to answer your questions. Let's go right here and then we will go over to you, sir. Yes, sir, and just tell us your name, please?

MR. UNKERFER: My name is Dick Unkerfer, a resident of Pahrump. What is your capabilities of doing the inspection on foreign imports from this into the field and the transportation?

FACILITATOR CAMERON: Rob, do you understand the question?

MR. LEWIS: Yes. That is a good question. Until recently, until about 2 years or so ago, all the

fabrication for spent fuel casks has been done in the U.S., but some of the Japanese steel mills have started to do fabrications.

And we just recently went over to Japan and did our first inspection of two fabricators over in Japan, and that was in February. So we are starting to do a lot of that.

MR. UNKERFER: And what about the transportation across the oceans?

MR. LEWIS: Through the U.S. Customs Department mostly, we have the capability to -- the government has the capability to inspect the material coming into the country. The Nuclear Regulatory Commission, our inspection is more at the facilities where it is ultimately arriving.

But the Department of Transportation, through the Coast Guard, and the Customs Department, do inspections of material coming in, imports of materials coming into the country as well, and we work with them as well.

FACILITATOR CAMERON: Okay. Thank you.

MR. LEWIS: And, Chip, one more point. Just to clarify. We don't have spent fuel coming into the country, except for some very limited programs, with the Department of Energy bringing back research



reactor fuel from some under-developed countries, and they bring that back into the country and bring that to their sites.

But for the commercial side, there is really zero transport of spent fuel in to the country.

FACILITATOR CAMERON: Okay. Thank you.

Yes, sir?

MR. BIJOLD: Yes. My name is Jerry Bijold, and I live in Northwest Las Vegas. I would have gone to the Las Vegas thing, but I don't think I could handle seven hours. So I decided to come out here instead.

Under your favorable history that you briefed, you said 1,300 spent fuel shipments over 20 years. Could you tell me whether there were any accidents, or any terrorist or other events during those times, and what happened when they did occur, if they did?

MR. LEWIS: Well, first to the terrorism.

That's easier. We are not aware of any sabotage attempt ever on any spent fuel transport or any radioactive material I should say.

And there have been four transportation accidents, however, and in each of those accidents -- with four involving loaded spent fuel casks, in each of

those accidents there was no release and the cask was put back on the truck or train, and it continued on its way.

But there was one case in Tennessee, I think, where a driver was killed by the traffic accident. His truck jack-knifed and the driver was killed in the early '70s. But the radioactive material didn't have anything to do with that. It was just a traffic accident.

MR. BIJOLD: Well, the reason that I asked, and I have a follow-up if you don't mind, when I computed out -- you know, I live out in the Northwest side, and I figured that the DOT is going to want to use interstate highways as a preferred mode.

And so you take the Beltway around to Las Vegas if you use that as an example, and I live a couple of miles from there. And so when I computed this out, and Bob agreed with me, within plus or minus 10 percent probably, that I would have one high level nuclear waste truck every 3 hours, 24 hours a day, 7 days a week, for 38 years. Is that close?

MR. LEWIS: Well, I think the Department of Energy's final EIS, Environmental Impact State, for Yucca had some predictions of the transport, and I think that Bob Halstead has produced some alternate

numbers.

MR. BIJOLD: Right.

MR. LEWIS: So, depending on the number of trucks --

MR. BIJOLD: Well, I am not going to argue plus or minus 10 percent. I mean, it is pretty close and that is my point.

AUDIENCE: Well, what if it is 20 percent?

FACILITATOR CAMERON: I want to try to get you on the transcript, guys, and so let's keep this a little orderly. Let me make sure that we answer Jerry's point. Go ahead, Bill.

MR. BRACH: Well, I would like to come back to just a little bit on the numbers, and realized that the Department of Energy has not finalized or identified not only definite transportation routes, or finalized on the exact numbers of shipments, but the information that I have seen, and am generally aware of, is that the Department of Energy has forecasted in the neighborhood of about a 175 shipments on an annual basis, and that is 175 per year.

And if I remember the numbers correctly off the top of my head, it is about 130 rail shipments that they have forecasted and about 45 truck shipments.

I believe that is --

MR. BIJOLD: I should specify. It should be only trucks that I am talking about.

FACILITATOR CAMERON: I hate to keep reminding you of this, but that you really need to be on -- we need to have one person at a time speaking, and we need to have it on the transcript.

MR. BIJOLD: I'm sorry. What it was is that I was using a truck scenario. I was not using a truck and a rail scenario, because I was just asking about trucks. I'm sorry, but I should have specified that.

So under a truck scenario what would the figures be approximately?

MR. BRACH: Well, my understanding of that is, and again I am giving the Department of Energy's information, is that they have forecasted on an annual basis about 45 truck shipments per year.

FACILITATOR CAMERON: Okay. And I put that number of shipments up there, and if we need to try and go back and refine that, we will do that for everybody. I am going to go over here to Sally, and then we are going to go over to this gentleman, and then we will go to the next person.

MS. DEVLIN: Thank you, and thank you all for coming. It is so nice to see so many familiar

faces, and of course I have the same questions for you, and most of the people here are relatively new to these conferences.

And you are always welcome, and we hope that you will come again and serve food next time. What is the matter with you. Anyway, this is the hardest thing I think for people to realize at a conference like this, but the main word is modeling.

You have nothing and you have done nothing, and this is all planning, and this has gone on since '93 that I know of. And the thing that bothers me as I said to Peter Swift at the NWTRB meeting, you will never get confidence from the public using surrogates.

And using dummies, and just modeling and more modeling. I said when you have a full-sized canister that you think will last for 10,000 years, and you put -- and I thought it was just half-a-metric ton of the spent fuel rods, and now you are telling me it is 2, and as many as 12, you have gotten enormous, and you seem to have nothing.

Now, how long is this modeling going to continue, and how long is it going to continue costing us, and what do you project? I have never heard these questions answered, because we are not talking little

stuff.

These canisters or whatever are 14 feet long, and 8-1/2 feet wide, and there is not a road that would hold them and so on, and I am not going to get into that.

I am just talking about your modeling, and it really concerns me because this is going to be if it goes through a real live project that is extremely hot.

I don't hear anything about the 130 degrees C., or the 360 degrees C.

You are all modeling, and I am very disturbed by the length of time that you modeled, and you have gotten it down to two companies, and I am just wondering what your excuse is, and how much money you are spending. So, Amy, answer that.

FACILITATOR CAMERON: Okay. Let's see. Where should we start with Sally. Do you have an answer?

DR. MURPHY: I think probably the answer that you are looking for is the one associated with the actual testing. We are proposing that if our plans continue on the schedule that we are looking at today, that we will be testing in 2004 and in 2005.

So at that stage, we will be trying to confirm or validate the simulations and the

calculations that we have been using. So we are looking to have an answer for you as far as specific data in 2004 and in 2005.

And that would be for two tests of rail casks, a fire, and an impact test of a rail; and a fire and an impact test of a truck cask as currently proposed; and as we go through the discussions this evening, you will hear that there are folks who are suggesting that we do more. But right now the plans are for four tests.

FACILITATOR CAMERON: Amy, do you have anything that you want to add to what Andy said?

MS. SNYDER: That is what I was going to say.

FACILITATOR CAMERON: Okay. Wonderful. We are going to go to this gentleman in the back, and then we will go up to the gentleman who is standing at the microphone. Yes, sir?

MR. MACHARSKY: My name is Gary Macharsky, and I am a Pahrump resident. I was just wondering that when you get the actual models doing the tests on the fire and the impact accident tests that we all understand, are you going to simulate a terrorist attack?

Are you going to shoot a depleted uranium

round? It will cut through that like butter, and you all know it will happen. My other question is do you have any plans, or do you know if there are any plans with Homeland Security that when they escalate the attack up to orange like it was last month, are you going to stop these shipments?

Are you going to pull them off the road?  
What do you have planned to take care of that problem?  
Thank you.

FACILITATOR CAMERON: Bill.

MR. BRACH: The first question that you asked pertained to the plans for the package performance study, and the testing that we have talked about also includes sabotage testing, and the answer is, no, this study that we are describing tonight does not include terrorism sabotage testing.

Rob Lewis earlier made reference to some of the activities going on with the NRC with regard to -- we call it post-9/11, but it really is looking at terrorism and sabotage concerns, especially in light of what happened in September a year ago.

We are looking at and considering sabotage events and activities. One aspect that I will clearly want to try to identify is that in the tests that we have described, the impacts, the fire, there is much



information that we will learn from the structural or from the behavior of the casks in those environments, whether it be the impact at 75 miles per hour, or whatever speed is selected eventually for that cask, as well as the extreme fire conditions.

The information that we learned from those tests clearly we will be carrying over to those folks at the NRC that worked on the security side, and who are examining the cask capabilities to withstand terrorism or sabotage-type issues, because the robustness or the structural capability of the cask, and its robustness and its capability to withstand high temperature loads and heavy impacts, or hard impacts if you will, that same type of information is important in their activities, because they are studying and looking at the capability of the cask to withstand a terrorist type of attack or approach.

The second question you asked -- and this pertains to the different threat levels that the Department of Homeland Security has established for our country, and the five color code scheme.

Rob had mentioned that we have issued interim compensatory measures to the industry that we regulate. That clearly includes those licensees who are involved in spent fuel transportation, and it

includes nuclear power plants, facilities that store spent fuel, and facilities that handle nuclear materials.

We have laid out, and I can't go into the details, and I apologize, but we have laid out for the different levels, commensurate with the five levels of security, different expectations, different actions, that we, the NRC, and having issued orders, do require of our licensees to take based on the very different levels of security that we are at.

And realize that we are going to go from the yellow to the orange level, and there are measures when that determination is made that we have gone to a different security level, there are additional actions that the licensees are required to take in that regard.

Now, I cannot apologize, and I can't answer your question specifically, because I can't go into the details of what those different measures are.

But within the NRC, we have worked that across the realm of the regulatory activities, the nuclear activities that we regulate, as well as we have worked that with the Office of Homeland Security.

So we are trying to maintain a consistency of NRC actions with other Federal government actions at the different threat levels.

FACILITATOR CAMERON: Okay. And, yes, sir?

MR. GREEN: Yes. My name is Bill Green.

When this gentleman was talking and he had mentioned or said working along with FBI and CIA, I just wondered that now that they have formed this Homeland Security Department, why we deal with those separate entities and we don't go directly right to the Homeland Security and they double-check, and then they tell you?

Because that was the problem that we had before. Too many people were asking too many, and nobody was a direct line. I understood that was the reason that we formed this whole different department.

MR. BRACH: Let me if I can, and I will try to add to that, and if I don't answer your question, please tell me. Rob's reference to the FBI and CIA, and your reference to the Department of Homeland Security, one, the NRC is a small agency if you will.

But recognizing the role and the concerns with regard to terrorism and security with regard to nuclear activities, whether it be spent fuel transportation, nuclear power plants, or others, the NRC is very active in coordinating with the new Department of Homeland Security, and usually the Office

of Homeland Security beforehand.

But the other intelligence agencies, to be sure to the extent in the national circles that there is information with regard to concerns on terrorism, and the gentleman's earlier question about the different threat levels, to be sure that we are coordinating and aware of information so that if there are actions that the NRC would need to take, whether it be a change in the security or a threat level, or if there is information that is pertinent to nuclear regulated activities, and not necessarily on a national level that might necessitate a change in threat levels for the entire country, but maybe a concern with regard to nuclear activities, that network, that communication exists and works.

And Rob's reference to the other agencies was just as an example of the interactions that we have staff at our agency that maintain a continuous line of communication with these other agencies. So that type of information we would be aware of hopefully as soon as it is available in the Federal Government.

MR. GREEN: And basically my other questions were pretty much the same when you said full testing. You know, since 9/11, and you keep bringing up 9/11, since then we have never thought that two

airplanes would bring down two skyscrapers.

And then also that hand-held rocket launchers just being shot, and I just can't believe that fire testing and dropping on the end, I don't know how dropping on an end -- unless it is a straight impact at 75 miles an hour and that would be another test.

But dropping it on the end, I don't see how any one of those casks will end up dropping on end from 75 feet straight up other than this test. I don't understand. Thank you very much. I think there are other tests that need to be done.

And it is like when you travel with your cask, I believe that with the weight factor that these roads have to be at a minimum a certain level before they can go anywhere.

And in the State of Nevada, there is not very many roads that would meet any level of stuff. Thank you.

FACILITATOR CAMERON: Andy, do you want to talk about how the drop test reflects real conditions?

I think that is what Mr. Green was talking about.

DR. MURPHY: Okay. I would like to address a couple of your questions here, and particularly we will start with the question of the end

drop of the cask from a tower.

We are talking about dropping it from a tower to reach a velocity of 75 miles an hour. The cask will not be dropped in a simple end on fashion, but will be tilted so that the center of gravity of the cask is over the lid, the corner of the lid.

So that you are getting a more challenging impact on that cask by dropping it in an orientation that is cocked to one side. Part of what we are doing with this program is validating the computer codes that we use to study, and the models that we use to study, the behavior of the response of these casks to different accident scenarios, different sequences.

The one that we have chosen and talked about in the protocol report is a challenging one for both the cask and for the computer codes. Our intentions are for our analysts to predict what happens to that cask when it is dropped in that orientation.

We anticipate that there will be deformation, permanent deformation of that cask because of this drop. The code analyst will tell us before the test happens how much deformation to expect.

This deformation may be -- I will say a 2 inch dent, a 5 inch dent, and we will know that beforehand, and the public will have that information,

and they will have the uncertainty bounds on that 5 inch deformation beforehand.

And there will be public viewing. We anticipate having a tutorial before we do the tests, and an ability for the public to view the tests and to see the test specimens afterwards, and to check to see whether or not our calculations have been correct. That is kind of a longwinded answer to your question.

MR. GREEN: Why would you test when this big thing is like this, and then the center is the main thing, why do they drop it on the end part of it? Because you can hit a bullet on the end of it and it will not explode.

But if you hit it direct center, that is when the problem occurs, because you have that cushion from center to out there. I just wonder why they chose to drop it like that.

FACILITATOR CAMERON: Thank you, Mr. Green. Can we add anything? I know, Rob, that you wanted to say something, and then we will have a question or a comment further.

MR. LEWIS: I just wanted to make a point that Bill said, and I said, too, that we don't want anybody to get the impression that we are not looking at sabotage or terrorism type events.

We definitely are, but it just is that that type of information and the possible types of attacks that we are looking at, and the consequences of them, those are not public information.

But you can kind of get a feel for the complexity of those studies by looking at this type of study to see the level of effort that we put into studies of this kind. So you can do that, but that is how it is.

We are not singularly focused on security issues. We can't only look at security and forget about possible transportation accidents. So we have to look at both, and we are here tonight to talk about the transportation accidents.

The cushion at the end of the cask, part of the reason for picking the speed we did was to make sure that we fully crushed that, and then put some force on the cask body itself.

FACILITATOR CAMERON: Okay. Why don't you tell us what is on your mind, and then we will go to Mr. Neff, and then Kalynda, and then you. Go ahead.

MS. HOLGREN: My name is Judith Holgren, and I am a resident of Pahrump. I have a question about -- I would like to distinguish between the transportation canister which you will be testing, and



the storage canister, which will be going into the repository.

With these canisters, which are going to be used for transportation, will they be carrying at any time storage canisters, which will be going into the repository?

MR. BRACH: I may not be able to give you a satisfactory answer. It is my understanding that the Department of Energy has not yet finalized the canister that would be the ultimate disposal canister that would go into the repository.

What we are talking about tonight and the schematics of the Holtec and the General Atomics, the rail and the road casks, or truck casks that we have shown, those are casks -- the Holtec casks, for example, has an inner-canister.

And you may hear us in some of the discussions refer to that as a multi-purpose canister.

The two purposes that we are talking about that make it qualified if you will for it to be multi-purpose is for the transportation and the storage, but that storage is not the storage as with the disposal in the repository.

That storage, as it may be stored, for example, at a nuclear power plant, where the canister

would be loaded at a nuclear power plant and stored perhaps at a concrete storage pad at the nuclear power plant, and then that inner-canister would be put inside of a transportation overpack with what we call impact liners or cushions, or shock absorbers, excuse me.

So that the canister that we are talking about and that would be included in these tests, would be for storage potentially at a nuclear power plant, or another waste reactor storage facility, and the transport.

And I qualified that, because to my understanding the Department of Energy has not yet finalized the design for that canister that would eventually go into the disposal facility or repository.

MS. HOLGREN: Okay. And taking that in mind then, will there be a situation at Yucca Mountain where these intermediary transport -- I will call them inner-casks, will be unloaded into the storage canisters, which will go into the Yucca Mountain repository?

MR. BRACH: Well, let me qualify that. I am not a Department of Energy employee, and so my understanding of what the Department of Energy has described in their environmental impact statement is that the canisters, when received at the repository,

would be unloaded, and then that spent fuel would be loaded into a disposal canister for disposal at the repository.

Now, I may be wrong, but that is my general understanding.

MS. HOLGREN: And then from the point of view of terrorism or whatever, have there been any plans made to defend this particular -- I guess you would call it storage or unloading facility; and this will be above-ground I am assuming?

In other words, they will be taking the in-the-cask from the transportation canister, and they will be unloading that at the Yucca Mount repository, and putting that into what you call the waste package, or the permanent storage cylinder. Okay. That particular facility will be an above-ground facility, and have there been plans made to defend that should that be necessary?

MR. BRACH: Okay. The Department of Energy is required to submit a license application to the NRC for the repository. That license application will need to describe all of the safety and all of the security measures that the Department of Energy would take to protect that fuel both from safety and for security, or sabotage reasons, and that would have to

include all of the fuel handling, all of the fuel movement activities.

And again I am qualifying this because we had not received the applications, and so I can't tell you definitely what the Department of Energy's plans are or will be.

But if as you describe it, the application would have to describe the safety and security measures that they would take to assure the protection of that material. And that application would be subject to NRC's review and approval, both by NRC safety experts, and staff, as well as our security experts with regard to protecting against terrorism or sabotage type of concerns that you have mentioned.

MS. HOLGREN: Okay. Thank you very much.

FACILITATOR CAMERON: Thank you for those questions. Before we go to Mr. Neff and the rest of you, we have been remiss in one part here of telling people about the comment period, and how they submit their comments, and when the comment period is over. Can we just do a summary right now for people on that?

DR. MURPHY: Yes, I would be happy to.

FACILITATOR CAMERON: And, Mike, thanks to Mr. Bob Halstead for reminding us of that.

DR. MURPHY: Right. I would ask the folks

who have not picked up the presentation that I used in Las Vegas to pick up a copy of it, because some of those particular points of information are there.

And rather than trying to verbally give you a 45 letter long address, and it is also in the protocol report. Thank you, Kalynda. Thank you. It is there. There is an NRC website that has a copy of the test protocols, and there is a link in there directly to a comment page where you can leave your comments for the NRC.

Very specifically, the other question is that the comment period is approximately 90 days long.

It is longer than 90 days, and it ends on the 30th of May of this year.

The comment period includes materials presented at this meetings, and the materials that are submitted through the internet, and materials that can be submitted either by fax or the old fashioned way of physically mailed letters. Thank you.

FACILITATOR CAMERON: Okay. And I will put the website up on this flip chart, too, if that makes it easier for people. But let's go to Mr. Neff.

MR. NETH: Henry Neff, Nye County Commissioner. My question is a little bit different.

I am more curious about the materials that will be

transported inside the casks. And not really understanding radiation that well, I would like to know if on the theory of theoretical happenstance, if one of those depleted fuel assemblies was to pop out the back of one of the transportation canisters, purely theoretical, and fall on the road, what is the time distance for a human being in regard to the exposure to that particular cell?

Or if you wanted to make it even more simple, that canister falls off and breaches, and there is a quarter-inch crack in that canister, what can we expect as far as release goes?

What would have to happen for a human being to get enough exposure to actually be damaged from that exposure?

FACILITATOR CAMERON: Okay. Rob Lewis is going to answer that.

MR. LEWIS: The dose from an unshielded spent fuel assembly is very high, and it would be very hazardous. It would not take very much time at all for a person to be injured by that. The distance and exact numbers would be dependent upon the specifics of the fuel.

But the important thing to think about, too, is that the fuel really can't pop out of the cask.

But there can be -- the second scenario that you described where the cask may be damaged, and there may be a pathway to the environment, or a pathway for the radiation to come through.

In that case the spent fuel is still shielded, and there is a much longer time for the emergency responders to act and injuries would probably not occur in that situation.

MR. NETH: If the crack were on one side of the canister, then obviously this stuff doesn't spray out and form a cloud of radioactive particles, and proceed in a straight line from their origin?

MR. LEWIS: Well, by way of example, these tests that we are proposing here, they are very severe tests, and in these tests I should say there is no release of radioactive material from the cask.

And these tests have probabilities, and we hate to talk about probabilities, but in terms of realism, and the shipment numbers for Yucca Mountain would be 175 shipments a year, you are talking on the order of an accident that is like one in a million, or 1 in 10 million, and that is described in the protocols of how we calculated that.

MR. NETH: I understand the test that you are wanting to perform and everything, but some of the

information that I would find extremely valuable, that if there were a breached cask on the road, and if I were within a hundred feet of that breached cask, how much time would I have to get away before I got a lethal dose.

Or if I were on a freeway driving in the other lane going the opposite direction, and a wreck were to happen and a cask were to breach, how much time or how many people would be exposed, and how much time and how lethal would those doses be?

Now, this would be valuable information so that people could understand the time involved, and the amount of dosage involved by being exposed at certain distances from that material?

FACILITATOR CAMERON: Okay. We know that it depends on how many people there would be, and going into a lot of specific factors, but can we give any context to Mr. Neff on that issue? Rob.

MR. LEWIS: In an accident, we rely very heavily on the training of the emergency responders and the HAZMAT team to establish the safety around the accident.

And everyone has heard of hazardous material accidents, where neighborhoods had to be evacuated or something. In the case of spent fuel, in



the regulatory test, which is a very severe test and it encompasses many accidents, the amount of material that could be released in that is very small.

It is equivalent to -- it is almost negligible, but it is the amount that is equivalent to a radioactive material package that doesn't even have the accident resistance packaging, and just the common type package.

And there really would be no prompt deaths, or immediate health impacts from that if the proper HAZMAT response occurred.

FACILITATOR CAMERON: Mr. Neff, are you suggesting that it would be helpful in this report if, or in some other report, if there was some description given to people on what possible exposures are? Is that what your main point is?

MR. NETH: Yes, that is absolutely correct. I mean, for people to come -- I mean, I think what I keep wanting to base this on is that I have heard that if you got within 3 feet of a breached cask that you would get enough of a dose to kill you.

However, if I see a truck tipped over on the road with a spent fuel canister on it, the last thing in the world that I am going to do is go running up there and see if the cask is breached.

So I think what I am asking is that as far as in an emergency situation where something does happen, what is a safe distance? I mean, if people have to get by the wreck or whatever -- do you understand what I am saying?

You are going to have our HAZMAT people going out there, and you are going to have to carron it off, and you are going to have to set up perimeters. What are those perimeters?

What is the exposure, and what is the dosage that could be released from a core, and I think that type of information would be interesting for people to know.

Could there possibly be accidents? Absolutely. What are the exposures from those accidents, and what can we expect?

FACILITATOR CAMERON: Okay. And I think we are going to have some comment here. And, Mr. Green, I see that you are getting ready to come up. I am going to have to go to other people who haven't spoken. So I don't want you to have to stand there for a long time, but we will get back to you. Bill, Amy, however you want to do it.

MR. BRACH: Go ahead, Amy.

MS. SNYDER: I think the important thing

is to put it in perspective as far as far as what real world accidents could occur, and then what potential exposure people could have, especially first responders. Would that be helpful to you?

MR. NETH: Let me put it in the most severe perspective. There is a ring of a hundred people standing in a 50 foot circle, diameter circle, and magically in the middle of that circle appeared an unshielded fuel assembly.

And I know that this is silly, but bear with me. At the word go, how much time would those people have to get away from that canister before they got a lethal dose? Or make the circle bigger, or whatever you need to do.

FACILITATOR CAMERON: I think we understand the type of information that Mr. Neff is looking for. Bill.

MR. BRACH: I was just going to offer that the question that you are asking is -- that from one standpoint, we don't have the information to answer right now or tell you, and I think that is information that we would need to consider.

But one point that I do want to make is that if you recall, one of the overheads, and I think Rob Lewis was showing, was a schematic, a cut-away

schematic of a cask.

And if you recall, in the inner-center of what looked like a pipe diagram is where the spent fuel would be located. And it showed the dimensions of multiple layers of lead and metal protection around the canister.

And then also if you recall, Ken Sorenson had a view graph showing -- it was the model of a structural impact of a canister at 75 miles per hour.

And if you recall from that schematic, and that is an extremely severe accident, what we call the impact limiter, the cushion on the end of the canister, was fully engaged if you will.

And the edge of the canister or the outside edge of the canister where the spent fuel was inside the canister, had some dent if you will. What I am trying to identify is that, one, clearly a goal and objective in our review and certification of transportation packages is that these packages maintain what we call the containment.

That is, that they maintain the fuel inside of the transportation package under all the accident conditions or scenarios that we evaluate. And I understand the question, that if that doesn't happen and it breaches and it opens, and that's what I am

saying, that I don't have that information with us to answer the question.

But the goal of what we do in our review and certification is to certify casks that can successfully pass all these different accident scenarios and conditions, and what we are looking at, and the subject of the package performance study, is going markedly beyond the existing regulatory limits for accident tests, whether it be an impact or a fire, and testing the ability of these casks to withstand those extreme or significantly beyond regulatory limit test conditions to be able to demonstrate that the integrity and the containment of that canister is -- excuse me, of the cask, is maintained, inside of the package.

FACILITATOR CAMERON: And I think that is an important point that you made, Bill, but I think that there still is an express need here for that type of information.

MR. LEWIS: I think what you are asking is a very common sense type of question, and really what we need to describe in this protocol, and that's why we published it for comment, was to see what is the best way to make people understand what we are trying to propose here.

And the doses around the cask that we propose, that is something that we can consider adding to give it perspective. And we will take that for action, and I think the DOE's final EIS again, that has some information in there about a maximum credible accident, and that is a similarly comparable type probability accident to this type of thing, and we can look at that in there.

FACILITATOR CAMERON: Okay. Do you have -  
- okay. You're fine? Okay. I am going to go to Bob Halstead, because I think he has some information that I think may be pertinent to this, and then we will continue with Kalynda and this gentleman.

And Commissioner Trummel, did you have something also? And Jim Williams, and many others.

MR. HALSTEAD: Yes, my name is Bob Halstead, and since 1989, I have been the Transportation Advisor to the Nevada Agency for Nuclear Projects. I have been involved with nuclear issues for about 25 years, and I want to say a couple of things in response to Commissioner Neff's question.

But first of all, I would like to make what may sound to you as an unusual comment coming from a representative of the State, which as you know strongly opposes Yucca Mountain.

But I want to tell you that the State strongly endorses the study that the Nuclear Regulatory Commission is currently carrying out. Now, for more than 15 years, we have advocated full-scale testing, and it is very important that the NRC is acknowledging this issue.

The testing of the cask is possibly the single most important transportation safety issue. There are still some other issues, but if I had to pick one out of the top 10, I would tell you that this is the most important one.

So first of all, I want to make sure that everybody understands that this is a really important thing that they are doing. And secondly I really believe that they are honest in asking for people's input, and they want you to ask questions, and if you think your question is stupid, don't be that way. Ask your question.

All the questions are relevant and all the ideas are relevant. I know that often in dealing with government agencies that people don't believe that, and if I didn't believe that, I would tell you, because my job is to -- that when I think these guys are wrong, my job is to harshly criticize them.

But in this case, I really think that they

want input, and that's why it is important that you send them something in writing, and not just what you say tonight with the transcript.

But you take these documents home and study them, and I am sure that the county has some very good experts in nuclear waste that can help develop a response to that.

And beyond that, I want to say that the State has a different proposal for testing. We would like to see all the cask designs, and not just two representative ones, tested.

That probably means a minimum of five, and a maximum of eight, and secondly, we want a different approach to the testing. We want to make sure that each of those designs meets the regulations, and then we want to do some additional testing to find out where the failure thresholds are.

Now, that is just one approach. You may have a better idea than we do, and I am happy to hear your ideas. And I finally want to say that I am a little disappointed not to have heard a more precise technical answer to the question that the chairman asked.

The reality is that spent nuclear fuel is very dangerous material, even after it has been cooled



for 50 years after it comes out of the reactor, has a surface dose rate measured in thousands of rem per hour. Now, the exact health impact over time and distance, people will vary a little on their assumptions.

But the bottom line is that 25 year old spent fuel, that is, that it has been taken out of the reactor and cooled for about 25 years, that is what DOE's program is based on.

Some of the fuel, however, that gets shipped could be only cooled 10 years, and that makes a difference. If I were to give you an average, and I have worked these numbers out, and they are on the State's website, because when I gave testimony before the U.S. Senate in May, this was one of the issues that I wanted to say, that he spent fuel without any shielding -- to make a long story short, as some of you know I have a big problem with, that it only takes from 1 to 5 minutes to get a lethal dose of radiation if you are within a yard of an unshielded spent fuel assembly.

Now, keep in mind that we don't allow people to get that close to it, and you would probably be shot by the security guards before you could get close enough to it to get that dose.

We have the most rigorous regulations we

have for any hazardous material precisely because this material is that dangerous. So on the one hand, I want to tell you that there is a big international and national set of regulations for the design of the cask, and keeping people away from them.

And limiting the amount of time that they stop in transit and so forth to protect you. But the bottom line is that it is very dangerous material, and I would hope that if this question comes up in the future that you guys would give a straightforward answer.

I mean, I am relying on your documents, and frankly documents from Sandia National Labs, which is one of the few places where they have got full-time people who spend all their time trying to figure out what would happen, for example, if you got too close to a spent fuel assembly.

I really appreciate the fact that these guys are holding this meeting here, and they had a meeting in Las Vegas, and you guys have turned out a larger number of public than turned out in Las Vegas, which I think is very much to the credit of Nye County.

Thank you very much. That was very helpful.

And let me go to Commissioner Trummel, and then we will go to Kalynda, and then this gentleman,

Jim Miller, this gentleman, and then we are going to work our way over to this side of the room. And then we will do it and come back over here. Commissioner Trummel.

MS. TRUMMEL: Thank you. My name is Candice Trummel, Nye County Commission. I have a few comments, and some of them are based on things that I observed at the meeting yesterday, and some are based on things here.

First, there was a famous political philosopher who in his study of communication said that there is a difference between strategic action and true communication.

And I know that some people's motivation is to see Yucca Mountain open, and some people's motivation is to not see it open. And therefore they direct all of their communication regarding the transportation and these tests towards that end.

And I would just like to say that I hope that we can engage in true communication, because the issue is not whether it is a good idea to ship spent fuel, and the issue is not how to stall to prevent shipments.

The issue is how we can try to make it as safe as possible, and so I would like to open by saying

that I hope that we are engaging in true communication to that end, and not just stall tactics or promotion tactics either.

So having said that, at yesterday's meeting, Mr. Halstead mentioned something regarding managing risks, and I think that is exactly what this meeting is about; trying to establish the protocols that will help us most effectively manage our risks.

We need very rigorous tests in my amateur opinion. The fire test for 30 minutes, I would like to see that definitely increased. However, as I stated yesterday, I don't know if testing to failure is necessary, because I don't know how long it would take to fail.

If it takes 30 years to fail, then I don't think we need to test it for 30 years, but I do believe that we need to test it for quite an extensive period of time based upon what we think is even slightly probable of happening regarding how long it would take for us to be able to get to the fire and put it out.

And the same goes with the collision test and the impact test, and possibly incorporating a puncture test, and all the other suggestions that you have received from people who are much more well versed on this subject than I.

I am glad to see that we are doing full-scale tests in order to validate or invalidate the accuracy of the predictive analysis that has been conducted by Sandia Labs.

However, we need to remember that we will never be able to guarantee an elimination of risk. People are at risk right now if we don't transport it.

There is already this waste and so people are at risk either way you go.

Now the question is how do we manage those risks. Also, I would like to say that I agree with what Kalynda had stated yesterday that at least some, if not all, of these extra regulatory tests should become regulations in my opinion.

And public confidence is one of the objectives which we discussed in more depth yesterday.

Then having a star performer of the casks tested thoroughly, but not making that the standard, is rather disingenuous to the public. I think that if these are the tests that we are going to show the public and say, look, this is completely safe, then we need to make those tests our regulations, and I would like to see that looked into.

And finally I would like to know what the acceptable variance between what the predictive

analysis shows and what the results of the actual tests are, and what is the actual variance there, because I believe that is tied directly into whether or not we need to test every type of cask that will be used.

If your predictive analysis is very accurate, then I would say that your computer modules are good, and we probably do not need to test every cask.

However, if there is a significant variance, which is something that would be debated as to what is significant, then we need to look at possibly testing all the casks. And thank you for coming to Nye County.

FACILITATOR CAMERON: And I guess one other point that follows from that which we heard yesterday is that the NRC should clearly explain why the particular tests of a specific cask is going to cover other types of casks also. All right. Let's go to Kalynda.

MS. TILGES: Kalynda Tilges, Executive Director, Shundahai Network. First of all, before I go into my questions and comments, I would like to say that Shundahai has put in suggestions, and we have studied this issue very extensively, and on the table, if you don't have it already, we put out two talking

points that gives our statements and our answers to the specific questions that they ask about this, as well as how we feel this program is going, and how well the NRC has done it.

Also, if the Waste Isolation Pilot Plan to New Mexico takes what they call transguranic (phonetic) waste, which is plutonium laced waste, people in New Mexico have been living with high level of sorts nuclear waste shipments for a few years now.

They wrote us a letter, and it is called the WIPP Experience, to explain to people here in Nevada what it is like living with very high radioactive shipments every day, and how the NRC and the DOE will work out degrading whatever standards were actually put in place.

So I suggest that you take a look at these and read them, and of course please form your own opinion. Take all the information into consideration.

Now, going to my questions and my comments, I would have to say that I have to follow up on Commissioner Neff's question.

I am shall we say expectedly disappointed in your answer. That same question was asked -- the room that we were in yesterday? The last time I was in that room for an NRC meeting, Commissioner Neff's

question was brought up like that.

And we went round and round talking about dose calculations, and probability, and risk management, and until the entire audience was on their feet screaming at the presenters to just give a damn answer. And I see the same thing tonight and I am really disappointed, but again I say it is as an expected disappointment.

If you have figured out what it takes to shield a cask to limit the exposure to 10 millirems, then you should have the calculations of what it is inside that you are limiting.

I don't see any reason why you should be fudging on this. I think it is ludicrous and it destroys my trust even more. And as I told you last night, Andy, after the meeting, I really want to trust you. But as it goes on, you don't give me any opportunity to do that.

So, anyway, on to my questions. Rob, about your presentation, you mentioned the new safeguards. You also talked about how you are not planning on doing terrorist scenarios with this. It is my understanding at this point that you have ruled out the need for terrorist scenarios in any of your accident tests. Is that correct? Is terrorism a



scenario that is not required for licensing of these casks?

MR. LEWIS: No, I think what I was trying to say is that terrorism is not part of the package performance study.

MS. TILGES: Is terrorism part of the licensing requirements right now?

MR. LEWIS: I am not sure what -- is terrorism part of our licensing requirements?

MS. TILGES: A terrorism scenario. In order for a cask to be licensed does it have to pass any type of terrorist scenario in order for the cask to be licensed for use?

MR. LEWIS: The tests that the casks have to pass include a drop test, an impact test, a fire test, and an emersion test. After they pass those tests, they are evaluated for their performance against transportation accidents and sabotage events.

MS. TILGES: But you do not specifically require a terrorism scenario -- say like the World Trade Center, or what the private field storage license was just denied on, like the very real possibility of an F-16 crashing into a cask. Those kinds of scenarios are not required for licensing? Can I get a yes or a no?

MR. LEWIS: Those scenarios are not part of licensing a cask, but the casks that are licensed are evaluated for those scenarios.

FACILITATOR CAMERON: I think it is important to be clear in answering Kalynda's question that even though it might not be part of certification that it doesn't mean that it is not accounted for in the regulations, okay?

And I think it is a great question, and we have to be very clear on that so that people know about that, and I am going to give this back to you, Kalynda, and I think that Bill wants to try to add something, okay?

MR. BRACH: Let me if I can. The certification of a cask is of the individual cask. The NRC has regulations that require -- and I think that Rob may reference, and also Bob Halstead made reference, that in addition to the cask that there are other measures that are put into place to provide the safe transport of that material.

And that includes aspects such as the presence of armed guards, selections of routes, coordination with the State and local officials, local law enforcement authorities along those routes, and that they are aware of the shipment and of the time

frames for those shipments.

And response capabilities are reviewed and evaluated, and communication networks are established to monitor and keep track of the shipment.

I can't go into the details, but these are all measures that are added to assure the safety and security of the transport as that shipment is being made.

So that the individual certification of the cask -- and Rob mentioned the different accident tests that are considered, and those are from the safety standpoint that there are additional security measures that are brought into place when the shipment occurs that are in addition to if you will the robustness of a cask.

But the capability to provide response and reaction to activities, or events, or sabotage events if they were to occur that would have response capability protective measures in place.

FACILITATOR CAMERON: Thank you, Bill. Go on with your questions.

MS. TILGES: Well, I am really glad you replaced shock absorber for impact limiters. It is a start, but clearly you all have a long way to go. Andy, on your presentation, you said that testing for

casks for Yucca Mountain.

Now, first of all, I think that is very premature, unless you know something that we don't.

DR. MURPHY: That was definitely a mis-speak.

MS. TILGES: Because last night you said that this was for any cask, any transportation, and it was not specific to Yucca Mountain. So please bear in mind that it disturbs me to have it just kind of roll off your tongue that "for Yucca Mountain."

This is supposed to be for any transportation, whether or not Yucca Mountain happens, and I don't really think it is right for you to give the impression that, yes, it is going to happen.

We are already being forced to try to believe that Yucca Mountain is a done deal when it by no means, way, shape, or form, is a done deal. So please be careful with that in the future.

DR. MURPHY: Right.

MS. TILGES: And I was wondering how when you are talking about a surrogate fuel assembly, how will you replicate the heat that comes off the fuel rods inside a real cask?

DR. MURPHY: I will ask Ken to comment on that part of it. I will say that is a specific

technical detail that right now is beyond my knowledge.

MR. SORENSON: Right now, we have not considered the thermal tests with an internal heat source. The goals of the test are to, one, validate the codes so that we can predict the temperatures. If we can do that in this pool fire scenario without the internal heat source, it is really a relatively easy manner to include analytically the heat source inside.

And quite honestly, Bob Halstead has alluded to some of the difficulties in putting in an internal heat source during these tests, and that is a very difficult test problem that we have, but we are open for suggestions on how we might be able to include a new internal heat source for these tests.

FACILITATOR CAMERON: Do you have a quick follow-up on that?

MS. TILGES: Yes, actually I have a follow-up to a question that I asked before about the terrorism thing. It just struck me again. That in June of 1999 the State of Nevada put forth a formal request to the NRC to look at this terrorism safety rule.

The State of Nevada has heard nothing back and I am wondering if there was a time line for that, or if you still have the letter or the request, or what

is going on?s

FACILITATOR CAMERON: Let me just ask before we answer, let me just ask Bob Halstead to add to that anything that he wants to. Go ahead, Bob.

MR. HALSTEAD: Let me make a general comment on the terrorism/sabotage issue. As some of you know the State has produced a number of reports on this topic. I am sorry that I don't have any copies with me tonight, but I will be happy to take addresses for people who want to have them sent, and the stuff is on our internet website.

I know that for some people that means it is available, and for other people, they would prefer to have it sent by written comment. In June of 1999, the State, because of our studies, filed a petition for rule making.

That is the formal way that you ask the NRC to change their regulations or in this case both to change their regulations and initiate a study. And we asked for two things.

First, we said we know enough about the threat of terrorism to ask you to immediately change your regulations right now to basically beef up the counter-terrorism measures.

And one of the reasons that we did that is

because in fact there was an apparent attempted sabotage incident in October of 1986 on a rail shipment of spent fuel from the Monticello reactor to the Mars, Illinois, station.

I know because I was in the Governor's Office then working for the State of Wisconsin, and I made the call to Jan Strasma (phonetic) at the NRC's regional office in Chicago to see how they were going to handle that.

Now, the NRC has a document called the safeguards -- you have got to help me out here, Rob -- the SFEL. There is a document where the NRC reports these incidents, and for some reason they decided not to list it in there.

But the point is that we looked at all of these issues, and we said that this is a realistic threat. We did not hear anything back from them. In the summer of 2001, I contacted one of my sources at the NRC and said, gee, I have to report to the State Commission and the Attorney General. Could you tell me what is happening.

They said we are just about to give you a response. I can't tell you any details. And then of course in September of 2001, 9/11 occurred. We have been trying to be respectful of the NRC's

responsibilities, and frankly we have not made a big deal.

Very often we occasionally ask them when are they going to get around to answering that petition.

Let me say, and Bill can't talk about it, and I can't talk about it, and those interim orders that Rob talked about, I can just say in some way, shape, or fashion, that is the clearest answer that I can give you.

Some of the immediate relief actions that we requested, immediate changes to regulations, the NRC has not acted to make it harder for people to mess with these shipments.

On the other hand, we still think that they have to deal with the reassessment of risk and we said to them that we are not sure that you need to do a physical test on a cask. Maybe you do and maybe you don't.

But that is one of the issues that you have to look at. We have decided right now for the State that we are going to treat this separately. We already have this document and asking them to consider whether they have to do sabotage testing.

And I am not trying to let them off the hook, but that is not my job. But I am saying that



they have said that they are now after 911 dealing with that separately.

It is certainly appropriate for other people to ask this. I know that the Congressional delegation has frankly said to me that they think that we need to rethink our position, and maybe we will by May 30th.

Right now we are putting in our separate comments on the accident issue for May 30th, and I don't want you to think that the State doesn't think that terrorism sabotage isn't important.

But we have been trying to understand -- and this is a national emergency over this issue. The NRC has had their hands full protecting the nuclear power plants, and so far I believe that they have made good progress in that area.

The issue of protecting the spent fuel at the plants is something that we think needs a little more work, and we are going to be among the groups arguing that they have to beef up the security at the plants.

The main thing that I want to say is this.

These are people of integrity, and I may differ with them on some of the technical things, but I don't think you should assume that they are trying to evade

questions about this. It is very hard to give answers.

Anybody who has a security clearance and knows what is happening can't tell you everything that they would like to tell you. And that is just a fact that we all have to live with. Thank you very much.

FACILITATOR CAMERON: Thank you, Bob. That was very helpful, and Bill, do you want to say anything about the petition, and then we are going to go to this gentleman and start working our way over there.

MR. BRACH: Let me say one thing. Bob's summary of the events from June of '99 when the petition was submitted, and leading up to our review, and consideration of the petition, and the events of September 11th, a number of us were shortly after that involved in as Rob was summarizing a significant amount of effort on the response activities, and working 24 hour shifts for many months following that.

The staff's action on the petition as Bob has characterized is still pending before the Commission. We did send a letter to the State of Nevada in November or December of last year on its current status, and as Bob has also mentioned, and Rob Lewis made reference to the interim compensatory

measures that were issued for not only spent fuel, but for other regulatory activities that were involved, whether it be nuclear power plants, or spent fuel storage.

And there is a similarity in some of the issues and activities that the State of Nevada had requested and petitioned for staff consideration, agency consideration, and our consideration, and the interim compensatory measures that were taken.

I cannot go into any of the details here, but your question, the petition is still before the Commission. It is not lost, and in our process we have not yet come to completion with a final recommendation as to the Agency's actions in response to the rule making request.

MS. TILGES: Thank you. That was a good answer.

FACILITATOR CAMERON: Thank you. Yes, sir. Could you tell us your name?

MR. PATZER: My name is Robert Patzer, and I am a resident here in Pahrump. This is my first exposure to these types of meetings, and the first speaker got me all excited because the key words were full scale testing. And I am a Ph.D. scientist and to me this means different than what you are really

talking about, is full-scale testing for predictive analysis.

And I think that should be clear. It has been as the meeting progressed, but it wasn't for the first 20 minutes. Another thing in your analysis of possible accidents, I am sure that some of you have had a Hazwaper (phonetic) class. You know, the 40 hour class for first responders.

If you haven't, you have somebody in your organization that has all the movies, and so forth. I suggest that you consider looking at the propane explosions. We have trailer tankers all over the rural southwest in Nevada. We don't have pipelines

And if you see in those tests that one of these things that happened in Kingman, the locomotive was about a quarter-of-a-mile from the propane tank that went, and a two-ton hunk of it was found over a mile away from that further on.

Of course, the whole train was just disintegrated. Well, this is a very likely thing. You can't go on the highway and not have propane tanks around.

Now, this is a slow explosion, and it is violent, but it is slow, sort of like the ammoniac nitrate fertilizer or diesel, where it kind of goes

oommmm (phonetic).

Well, terrorists wouldn't use a slow explosion. They would use the high tech explosions, which have a shock wave that could very well disintegrate a cask. And we talk about uranium rounds that would puncture it.

These newer explosives, a little satchel of it just destroys steel. And I think that this should be considered in your computer analysis. Maybe you can do some -- you wouldn't want to destroy a cask probably on purpose, but maybe a damaged cask, and see what happens to it.

FACILITATOR CAMERON: Thank you for that suggestion, and I think that if we do get suggestions that are not right on to what this study is looking at, but are relevant to the testing for terrorism sabotage, that we should make this transcript available on those types of issues to the people at the NRC who are looking at the security issues.

The NRC website is right there, but we do have a slide. Rob, do we have a handout that already has that written on it back there?

MR. LEWIS: Yes.

FACILITATOR CAMERON: So if you don't want to write all of that down, there is a piece of paper

that has it on it. The Nevada website that was talked about and that has material on it, the address to it is right up there, and we are going to go to Jim Williams, and then over to this gentleman. Yes, sir.

MR. WILLIAMS: I am Jim Williams, and I work with the Nye County Nuclear Waste Program, and I had a few questions that don't necessarily need to be answered now, but that I think would be helpful to us as we prepare comments on the report.

One is the pros and cons of doing the rail cask impact test with and without the impact limiters or shock absorbers. I imagine doing it with that you don't get any independent data back on the performance of the cask on its own.

And doing it without the shock absorbers is a tougher test, but arguably less realistic. So I would be interested in how you compare that, which I don't think is done in the report.

Another is that Commissioner Trummel mentioned the notion of doing an impact test and doing a puncture test, and then doing a fire test. And I am wondering whether there is a technical reason other than a marginal increase in the cost of all of this for excluding the puncture in that.

In a way that sort of follows the scenario

of the Baltimore Tunnel fire, in which the thing got punctured and then the fire came. Another has to do with the last step in the regulatory test regime, which is emerging in .9 meters of water.

And I am uncertain in my own mind whether that means that the casks that you are certifying are not certified for barge shipments that go over much deeper water. And if the answer to that is that they are not certified, then is that not an important thing for the whole, large scale prospective shipment program.

Another question, and Bill, I think you asked this about test to failure, and I have a preliminary question on that, is that if we test to failure at the impact stage, then what do we have to work with at the puncture stage?

And if we test to failure at the puncture stage, then what do we have left to work with at the fire stage. So I am a little uncertain about the mechanics of how you would do a test to failure program.

And then I have a last question that probably doesn't relate to this program specifically, or this testing program specifically, but it has always seemed to me a very important thing to say if the

nation decides to transfer its entire inventory of nuclear waste from 139 sites in 39 States to one place in this county, then there is a way to do that.

And that involves the minimum additional transfer of risk to this community, and in that connection, it is always -- I mean, you are out there certifying one cask proposal, and another cask proposal, and another cask proposal, and you wind up with casks, rail and truck, that are different in their outside dimensions.

And the way that they are lifted, and the way that they are opened, and so forth. And as you build a fleet of certified casks, should you not encourage them to be standardized in their handling and lifting aspects that apply to destination of this national system?

FACILITATOR CAMERON: I think that those are comments for the staff to consider. There was one question though about the barge certification issue. Rob.

MR. LEWIS: Yes, the one question in there that I think we have a response for right now is the certification of the casks is done -- they can go on any mode. They can go on rail, highway, or on barge, if they are certified.



The particular emergent test that you mentioned, the 9 meter emersion, or the 3 meter emersion, is a test that applies at the end of the entire test sequence, and in an accident scenario that might mimic as a transportation accident; a bad collision and a fire, and the cask goes into a river or something like that.

There is a separate emersion test in the regulations for spent fuel casks, and that is deep emersion, a hundred meters, I believe. No, 200 meters.

Thanks, Bob. And that applies to a separate undamaged specimen, because in accident scenarios of that nature, they don't have to do with first a collision, and then going off a bridge, and into a river.

And the 200 meters has a basis in continental shelves if you will that barges might go over.

FACILITATOR CAMERON: Okay. Thank you. We are going to go to this gentleman here, and then to the sheriff's office.

MR. KING: My name is Bill King, a resident of Pahrump and Nye County. Thank you for coming to what will probably be the county site for this proposed repository if it is built, and since we would be the final destination, all the shipments would

eventually come through Nye County.

And we would have the most exposure and the most concern, and that is probably why there is such a big turnout. I had two questions, and I think one of them was answered, but will your testing results give either a conclusion or comparison of what is the safest method of transportation, rail or truck?

FACILITATOR CAMERON: Andy.

DR. MURPHY: Good question. It is probably possible that once the codes and models have be validated that it will be possible for individuals at this stage to run the codes with different scenarios and to see what challenges arose from those different scenarios.

It is likely that the scenario that would provide the greatest challenge to a rail cask would be different than the one that would be used for the truck cask. And it is very likely that if you compared two rail casks that they would respond differently to different specific scenarios.

So that one might perform better in a particular collision and the other ones might perform better. It is a matter that once the casks are certified and we understand how they behave, that we could use our codes to understand how the individual

casks would behave in potential scenarios that would come up.

FACILITATOR CAMERON: Do you have a follow-up, Bill?

MR. KING: And since a rail cask by its size and familiar weight could haul a lot more fuel, and one -- and we are talking shipments. So one train could haul easily many of these larger casks, and so that we would drastically -- and we have looked at this with similar groups, but drastically reduce the number of shipments, and therefore the exposure, and was that considered in this comparison of what is the safest way.

First, we will come up with a cask, but then -- because the ultimate transportation concern all of us have is getting it from Point A to the eventual destination. What is going to be the safest way?

FACILITATOR CAMERON: Andy, do you have something to say on that?

DR. MURPHY: No, I think either Rob or Rick Boyle might.

MR. LEWIS: You hit the nail right on the head there. The benefit of rail transport, you can ship more casks in a single train and therefore there is less shipments, and you can have special trains that

have the best rail cars and the best designed couplers so that the train has a much less probability of being in a derailment.

And in addition the incident free risk is much less because there is less total transports. There is definitely benefits to rail transportation.

The NRC, however, is evaluating the casks on the basis that the casks are safe, regardless of the way that they are transported.

We find our level of safety, and then once you are below that, we approve it for use at that level of safety. And then people can optimize the way that they transport it below the level. So it becomes an argument on safe, versus safer. And it is not a bad place to be, I think.

FACILITATOR CAMERON: Okay. Yes, sir.

SHERIFF DEMEO: Hi, I am Sheriff Demeo of Nye County, and by the raise of hands, so many people here are concerned about terrorism attacks on these casks as they are moving through Nye County.

And the concern is that basically the NRC at times does do drills in nuclear power plants to test the security, and these drills are pre-planned in advance where they disarm the officers, and they give them guns that are basically paint ball guns, or some

type of gun that is safe.

And there has been security breaches even in those days that have been pre-planned, is that not correct? In fact, one occurred not too soon after 9/11, when they tested a plant over in California. And that has been in the newspaper, and it has been on the internet. So, I think even going on to some of the sites in the NRC, those security breaches have been recognized and identified.

The concern that the people here have is that if you cannot secure a power plant at a fixed location, what assurances can you give to the people of Nye County and my office that those considerations are taken fully into effect? I may not be given a high security clearance, but I have dealt with terrorists and I have dealt with terrorist cells during my time of employment.

And we find out by 9/11 that the same terrorist cell that had their footprint in the World Trade Center bombing in 1993 was connected to the World Trade Center bombing and destruction in the year 2001, on 9/11.

So from the show of hands here, there is a lot o concern, and in fact as I walk around the audience here I have been hearing a lot of concern

about this. I did not come here to discuss the NRC or this platform here, but I just came to provide some type of police presence.

But I think that there is enough concern here that I think that people don't want to a vague answer. When it comes time that these casts are moving through Nye County, I want assurances to my office and I want assurances that I can give to the people of Nye County that they are going to be completely safe.

And that the NRC and whoever is providing security, along with the local law enforcement, which would be the Sheriff's Office and Highway Patrol, are capable of doing that, and we are given from you, from the NRC, assurances that those things have been taken into consideration.

Because I think that the answers here were very vague, and I think that is why a lot of people are very dissatisfied with that. I myself was not happy with hearing the vagueness of the answer.

A terrorist attack is as much of a consideration to the people here in Nye County as the cask tests that are being presented here, and I thank you for your time.

FACILITATOR CAMERON: Thank you, Sheriff.  
Thank you for being here personally, for the meeting.

Bill, any comment?

MR. BRACH: I can only agree with what you said. While I don't live here in Nye County, we clearly share the concern that these shipments, if they were to occur to Yucca Mountain, that they would be safe here in Nye County, and they would be safe in all over localities, whether it be adjoining counties here in Nevada to Nye County, or in the gentleman's earlier comment about going from Point A and going to a point of destination.

And I thought that every hand would go up obviously with concerns about terrorism and sabotage.

We have the same objective and the same concern. And we take our responsibility of assuring the safety and the security, whether it be in transportation or other activities. That is if you will our fundamental mission for our agency.

And in dealing with spent fuel transportation, it is the responsibility that we have, and we are doing our best to be sure that safety and security are maintained and assured.

SHERIFF DEMEO: I don't want to belabor the point, but I think that consideration has to be taken from your security plans that you have, and I think that the people want to make sure that is

considered, that their safety is considered from all aspects, and not the fact that a cask drops off a rail truck at 75 miles an hour.

I think they want to make sure that everything -- that there is a very holistic approach to these cask transportations and movements.

MR. BRACH: That is a very excellent point, and while the focus of our being here tonight to meet with you and discuss with you the plans for these tests are from an accident and a safety standpoint, please don't take that that means that security and sabotage is not a concern and not an interest, and the points that you have made I agree with, and it is safety and security, and both have to be assured, and that's the responsibility that we have, yes. sir.

FACILITATOR CAMERON: All right. Grant.

MR. HUDLOW: I am Grant Hudlow, and I would to take another cut at what Commissioner Neff was trying to get at. Inside of the package each of these spent fuel rod assemblies contain in dust form the equivalent of the fallout of several Hiroshima bombs, each of them.

So if this thing gets hit, for example, with a rocket launcher, or gets split open with C-4, or even simpler things, and you name them, you are talking



about hundreds of miles where people are going to die.

And the radiation from the dust goes into your lungs and inside your body, and it is not a matter of walking by it. You are stuck with it until your lungs expel it, which takes a while.

These figures are available from the nuclear industry, and they are available from transportation figures and they are available from the DOE. This is not a secret.

So the seriousness of the problem I think is underlined at this point. Now we know what the problem is, and then we go into some other technical things. The cask itself, Sandia said it is a 15 pound pressure seal.

Okay. Lead melts at 327 degrees C., and you are going to heat the whole thing up to 800 or 900, or whatever, and the lead is molten, and what is the partial pressure of molten lead at that temperature?

How soon is it before it pops that seal?

Sandia also said that at 90 miles an hour that seal was going to crack open. We are talking 75 miles an hour here. Those are problems that are rather easily solved. Why would you have a 15 pound pressure seal on a cask containing something that dangerous?

The fresh fuel, spent fuel, comes out at

360 degrees C., and that has a pressure of 2,200 to 3,000 pounds pressure. Those pressures are easily handled in the chemical industry, and why can't the NRC demand that the DOE handle them?

And these are things that the general public has no knowledge of, but the scientists and the engineers at Sandia certainly need to take these into consideration.

There is one more thing. We have evidence of collusion between the NRC and the DOE. Judy Hollgren sent a letter to the DOE and the NRC pointing out that the NRC regulations say as these people pointed out require a safety plan.

The DOE in its paperwork to the NRC said they are not going to give a safety plan, and that they will only give a commitment to a safety plan. And the commitment is not legally enforceable. So that means that there is no safety plan.

There is three different kinds of safety plans. There is safety for workers, and there is safety for the public, and there is safety for the integrity of the whole system.

This is clear evidence of collusion, and it needs to be straightened out.

FACILITATOR CAMERON: Thank you for your

comments, Grant. Two things though that I think are important to clarify this, and I know that you weren't saying this, but you used a reference in terms of the material in spent fuel rods. You used a reference to bomb, and I think the NRC said to make everyone understand that one of the hazards at least from this spent fuel inside a canister is not that there would be a chain reaction and an atomic explosion.

And if someone could just verify that, because people shouldn't be thinking that there is going to be a mushroom cloud out there. Second of all, the term collusion is a pretty loaded, serious term, and I didn't hear anything that demonstrated any collusion between the DOE and the NRC, and I know that that is your opinion, but I just want people to realize that, okay? Anybody who hasn't spoken on this? Is there an answer on the collusion?

MR. HUDLOW: No, but he had several points that he brought up having to do with the chemistry and the metallurgy of it, and I don't hear any answers to that.

FACILITATOR CAMERON: I think that we have accepted those as comments to consider. Does anybody on the panel have anything to say about Grant's statements, in terms of pressure, et cetera, et cetera?

Andy.

DR. MURPHY: Yes, I do have specifically a comment about your concerns about the fuel, and what happens to it in a collision in particular. One of the tasks associated with the package performance study is to take and come up with, and do some experiments to understand how fuel in an assembly will behave in an impact situation.

At this stage, there is very little or almost no data to tell us how the material that is in the fuel behaves in an accident, and turns into respirable sized particles.

We have plans for the package performance study to do, and experiments to get data on that material. At this stage I will say that our plate is full right now with the impact and the fire, and the protocols and understandings.

But there are folks back at headquarters in Washington that are developing a program plan we will call it again on the experiments to produce that information.

And that plan will be available at some time in the future. And it is part of the integral package performance study, and will be carried out as part of that study.

FACILITATOR CAMERON: Thank you again, Grant, for those comments.

MR. AMBRIZ: Dick Ambriz. Tie is relative to transportation. I assume that there is going to be some company that is going to be transporting all these containers, and if this is the case, wouldn't it be advisable for the government to set up a GPS system that tracks every one of these every inch of the way; from where their destination is to where they arrive at.

If one of them deviates from the planned transportation route, then law enforcement should be notified immediately. I think that this is a very good thing that you are going to have to look at, because these trucks are on the road in some pretty desolate areas.

FACILITATOR CAMERON: Thank you, Dick.  
Comments?

MR. LEWIS: I think that is a good observation, and I think the actual companies that would be shipping, that is actually a decision for the DOE to make, whether that would be private companies or the DOE themselves.

The presence of a GPS detector on the trucks or on the trains is something that I think they

would look at both from a security standpoint, and from a merchandise standpoint. They want to track where the material is at any given time, and so I think that will definitely be something that will be strongly considered, and I would be surprised if it wasn't.

FACILITATOR CAMERON: All right. Did you have another comment, Mr. Green? And then we will go to Sally.

MR. GREEN: Yes, Bill Green. I would like to thank you for being here, but being a native Nevadian, and I am 46 going on 47 years old, and I remember watching the bomb blasts out there and stuff, and when you were skirting Henry Neff's question over there, it just made me think that -- well, we are Nevadians, and we don't trust the government much, because we have had problems with it, and we have had people die from working on the test site because they said it was safe, and it wasn't.

And in the Vietnam War, they were dying from stuff that they were told they didn't have, and now we found out that they have. I am just hoping, and I am praying, because I am becoming very saddened that we are not getting the truth as a public anymore.

That when you do this stuff that it is going to be for the best public safety there is, and

that all intentions are for the best purpose, and not for some, and not for all. I have just become very disenchanted. So, gentlemen, and lady, when you guys speak, we are Nevadians, and not Nevadans. Thank you.

FACILITATOR CAMERON: Thank you, Mr. Green. Sally.

MS. DEVLIN: And again thank you for coming. I have two questions. In the book which I was privileged to get before the meeting, you talk about hitting tresses on bridges, and this might present a problem, and I am sure that it will, because I learned how to build the railroads, and how to build the roads, both concrete and asphalt, and now I have to learn how to build barges, and you heard Jim talk about the barges and how this would affect transportation on the barges.

I also want to add durgibles. Remember that. But what my concern is that from the '92 to '94 when Bill and I met, was on the INEEL route transportation report one canisters, and they tested it at 24 miles an hour then, and so on and so forth.

One of the tests that they did that you are not mentioning, and which should pertain to Nevada, and that is the wind tests. They tested the canisters with 125 mile an hour winds, which we get here every

day.

And you have been out to the test site, and which they are getting in Iraq now. These are devastating winds, and I think it is very important that this be considered.

The other thing that we should consider in lieu of the tresses is the tunnels. Now we had a 3 day tunnel fire in Baltimore and you are not testing in tunnels, and these things are going to go by both train, truck, and maybe by barges through a tunnel. I am not sure what will happen in the next 30 years before any of this stuff gets done, if it ever gets done, because we know the costs of it, even though Amy won't say it.

I estimated the canisters at over \$50 billion, and I am just beginning to estimate, and I think I am very wrong, but I do want you to look into the tunnels and the wind, and the barges, and I think it is very important. And who is going to teach me to build the barge and the cost.

I can tell you the cost of the railroad through here, one of the three transport protocols, but who is going to teach me to build the barge? And I know they had one with 3.2 million pounds in Hanford from a reactor down there.



And we are talking king-sized stuff, and of course this also is the only way that many of the reactors can get their nuclear fuel out is by barge, particularly in Illinois, where it has the potential of killing 10 million people and polluting the water. So I hope that all these things are all considered.

And we realize that you are just modeling, but I hope that one of these days you do grow up and you do the real thing. Thank you.

FACILITATOR CAMERON: And I guess we are trying to grow up with this study, right, and do full-scale testing. Thank you for those suggestions, Sally.

Is there anybody over here that we didn't hear from?  
Yes, sir.

MR. MCGUINNESS: My name is James McGuinness, co-founder of Shundahai, and I live in Las Vegas. And starting off, I keep hearing that you really want to hear from people, and I keep noticing that you really don't want to hear from people. You set these things up in the day time when people are working or going to school generally.

You spent 3 hours here and you take up half of it by talking to us, which is great, and we want to hear this, but when individuals want to speak, I see them getting rushed unless they have a title, or

a job qualification, or they work with the State or the government.

And I think if you really want to hear from the people, set these things for 2, to 3, to 4 days in a row, and put them on for hours, and put them on at night so that people really do get a chance to listen and speak to you, because giving 3 hours, people work swing shifts here and this is a 24 hour town. It is a 24 hour State.

You really are not giving them much opportunity and I don't see that since you came here to Las Vegas that there is a whole lot of counties and communities that are going to get affected by the transportation, why are they not open to these things? How come you are not going there?

I want to see how much time you spent working on these issues right here, and how many person hours were spent on this, and now many person hours are actually spent listening to individuals that are going to be affected by this issue.

And I would like to also figure out that I heard that the Department of Transportation has the primary responsibility for transport. Is there a great accident fund, and how much is in that accident fund, and who is primarily responsible if there is an

accident and money has to be paid out.

Can you tell me exactly how much is going to come out of the Department of Transportation, and how much is in the Department of Energy, and how much from the NRC. And if the money happens to get paid out because of an accident will it be replenished, or when it ends you said, oh, that's too bad, and we are going to continue to ship this waste and forget about the rest of you.

Since I keep hearing that safety is the big factor here, what is the allowable deaths per shipment or per all the shipments? I never see that put out, and I know it is there and I have heard it from the Department of Energy. How come that is not prominent?

Many people know that you do have things like allowable deaths for these issues, and that you always seem to hide and try not to get. And it greatly disturbs me when I hear that you are not aware of any of these accidents, and any of these possibilities, because that is your job.

You are telling me that you are not aware, and it's not that you are telling me that it didn't really happen. Does that mean that you are looking for what we used to call plausible deniability?

That therefore you can say, hey, I don't know and so therefore it didn't happen, or I am just a low person on the totem pole and I am not being told.

If you are not aware, bring someone higher up and bring them to talk to us, and let someone who is aware of these issues speak to us.

And then you have all these experts, and I am just a simple guy. I am lucky I got out of high school, all right? You are out here and you are experts, but yet whenever you are being put to a specific question that you are not comfortable with, you dance.

And that is terrific if you are in a ballroom, but it is not a good time right now. We want to hear specific answers. And 1988 was my first hearing that I went through, and people were talking about this even before there was a really big transportation issue.

It is now 15 years down the road, and you are still saying the same thing. We really don't know.

Well, if you don't know, let's shut down the facilities until we get the answers, because the facilities are what are responsible for this waste, and what is going on is that you are basically working for the nuclear industry, and you are working for the

government, which really wants another 50 reactors to get put on line as soon as possible, which means more waste will be coming this way if it does come.

And it is always when it comes, when it comes, how is it going to be transported, and where it is going to be transported. It is never if. If you really cared about what the people said -- and we keep hearing zero. People in Nevada said zero shipments, no Yucca Mountain, and you don't even have that up there.

So therefore you really don't care what the people are saying, and all you want to do is put this little dog and pony show up there, and I hear about this true communication. There is no true communication, because you are not listening. You still do not after 15 years that I have been going to these things, have at least the possibility that it will not be brought here, and that there will be no shipments.

FACILITATOR CAMERON: Okay. There is a couple of points there to address. One is to explain what the coverage is for liability for accidents, and how does that happen, and there is something called the Price-Anderson Act, and I don't know if we can give Mr. McGuinness the details on that now.

And I think that Mr. McGuinness, in fairness to the staff, there were some questions that they did not have the specific information on. But the thing is that they know that the certification regulatory framework for these casks has worked, and I don't think that anybody up here said that they didn't know how many accidents there were.

I think that Mr. Lewis specifically cited some statistics on that. But given that, obviously we want to hear from you and we want to listen, and if there is something that we need to evaluate, we will do that. Can anybody talk to the liability issue a little bit? Rob Lewis.

MR. LEWIS: Concerning the liability, there is a requirement to have insurance for the material that is shipped, and I think the Department of Transportation requires the carrier, the transporter, to have disaster insurance in the amount of \$50 million for each transportation.

And there is also a law called the Price-Anderson Act, which is a national law that covers damages, liability from nuclear type accidents. It is currently active and applies to cleanup beyond \$50 million, and the Congress has been considering extending that Act.

The other thing is that when I use words like I don't know of any releases or injuries from radioactive material, nobody else knows of any that I know of, and the reason that I used those words is because I can't tell you what I don't know.

So it is not that I am trying to hide something or that I am implying that anybody else does know it. It is just that no one knows it, and none have ever been reported.

FACILITATOR CAMERON: Bill, did you have something?

MR. BRACH: I just wanted to try to address two of the other comments that you made. One is the question about the allowable number of deaths in transportation. I want to go back to what I tried to describe before in our certification process.

We don't certify a package until at least through our review, and within our office we have a number of folks who have skills in nuclear engineering and structural and thermal, and materials experts.

So we go through the design of the transportation package, and we do our review and our separate modeling analysis of the different tests and conditions to assure ourselves that the package design successfully meets all of our test criteria .

And Rob mentioned this before. This is the drop, the puncture, the fire, and the emergent test, and to successfully pass those tests, the package has to maintain its containment of all of the contained material.

By maintaining inside that package all the material, we shouldn't be looking at any adverse or harmful effects on people where death would be as a result of the transport of the nuclear material.

Rob mentioned, and the information that we have on the 1,300 shipments that have been carried out in the last 20 years in the shipment of spent fuel, was that there were four accidents. Rob described one of those accidents did involve the death of an individual.

It was a death due to the impact of the truck and the cab and not as a result of the cargo, of the radioactive material or the cargo that the individual was transporting.

The question of allowable deaths, our certification activities are based on those packages containing the material and keeping the material inside the transportation package, and so it is not based upon a statistic that these packages will rupture X-percent of the time.

The packages are certified to maintain the



material inside the containment package.

MR. MCGUINNESS: Well, you keep putting up the best case scenario. If everything was the best case scenario, there would be no problem. But you also say right here the real test, and you said control is important. Yes, you can control it in your laboratory, but you can't control what is going on on the highways.

And therefore if control is so important, you are putting everything in a best case scenario. We want the worse case scenario, because that is what worries me.

FACILITATOR CAMERON: Okay. Worse case. Comment. Look at the worse case scenario.

MR. HALSTEAD: Could you write that up there?

FACILITATOR CAMERON: I am going to.

MR. BRACH: I would also like to comment to a question that you raised, and we heard this yesterday as well on the scheduling of the meetings, and the sequencing of the meetings. At yesterday's meeting, we had a meeting in Las Vegas, Nevada, and it started around 10:00 and it ended at about quarter-of-eight yesterday evening.

We scheduled it at 10:00 because we had a roundtable discussion and a number of people at the

roundtable were invited people and they represented various government organizations, local organizations, local government, as well as other organizations, and many of the people at the roundtable, they were there if you will in their work capacity I will call it.

And so the predominant part of the meeting was during the daytime hours, which also matched with their work hours if you will. We specifically scheduled the meeting to run into the late afternoon and early evening hours to allow time for additional folks, members of the public or other interested individuals, to attend the meeting if you will who may have a day time job, to come in the late afternoon or early evening to have an opportunity to participate, as well as ask questions.

And a number of people were present and did ask questions. Bob Halstead made an observation, and I thank all the people who are here, and I realize that time is marching on a little bit, but there are more people here tonight, members of the public if you will, generally interested in the topic and yourself have questions that are here, and are asking questions.

Now, the meeting here in Pahrump this evening, we scheduled it very specifically in the evening to try to provide if you will maximum

opportunity for those people that have day time jobs to have an opportunity to be here in the evening to ask us questions.

I mentioned previous meetings that have been here in Pahrump. Some were in the day and some in the evening. And the evening I think is more accommodating, especially for people who have a day time job to be here in the evening.

So we are trying. I wrote down your comments, because I realize that we are trying to schedule our meetings to meet as many people's needs as we can. And your comment about having back to back meetings, and involvement in other countries, I appreciate your comment.

FACILITATOR CAMERON: Okay. I know that Kalynda has something and Jerry, and Bob Halstead.

MR. HALSTEAD: I just want to make a quick comment. I have been in government for a long time, and I have actually been an ombudsperson, and it is a hell of a thing to try to do what you are saying, to give fair opportunity, and I don't know the answer, but I will say one thing.

I think that the approach that Kalynda and some other people came up with of setting up a video or setting up a camcorder and having citizens put their

comments in that way, and having the NRC make a commitment that they are going to pay attention to those comments just as if someone had come to a meeting. That is one way.

That is not the only way to do it, but I just have to say that in general that we don't do a great job on this with the State of Nevada, and we didn't do a great job on it when I worked for the State of Wisconsin, and there has got to be better ways to get public input.

And, yes, it is easier for people to e-mail stuff in these days than it was 30 years ago. But we certainly all need to work harder on that, and I would like to see greater use of that video approach, because I think that is a good way, and then when the video comes in, they can require that a transcript be made of the video as if you were here at the meeting doing that.

But that is certainly one way that we ought to probably all try to expand the opportunities for people to make their views known. And I really think that the organizations -- and I don't know who all worked out that video approach the other night, but I think that is one good way of doing this. But obviously it is not going to be a perfect solution.

FACILITATOR CAMERON: And it is a point well taken, Mr. McGuinness. We can always try to do better on that. Kalynda, and then we will go to Jerry.

MS. TILGES: Kalynda Tilges. Shundahai Network, Public Citizen, out of D.C., and Nevada Nuclear Waste Task Force, put that workshop together and did the video. And in fact thank you for bringing that up, because the NRC, for whatever reason, is not going to be able to do any more public workshops or I don't know how that is going to work.

But the Shundahai Network is working on getting workshops together where we can maybe get Fred Dilger or Bob Halstead in as experts and to do public workshops and taking it out to the different counties and the different areas ourselves, and giving people as much information as possible from both sides.

I have to say that I am very strongly opinionated against this, but I don't expect you to believe me any more than I expect you to believe them.

I want you to go and get information from every possible place that you can find it, and read it, and study it, and make up your own mind, and then however you feel about it, whether it is with my position or against it, stand up and say something and be counted, even if you are totally opposite the way the anti-

people feel.

It doesn't matter. I just want to see people get involved. And I have to say as well, and again going back to our conversation last night, as far as trust goes, the people are smart enough to know that nothing is 100 percent.

However, if they see that the NRC is bending over backwards doing everything they possibly can to ensure the public safety to be completely open and transparent, and when we have a question that you don't know the answer to, or as a matter of national security, you can't say, don't fudge. Tell us. We can accept that.

If we know that you are trying as hard as you can beyond what the legal training limits are to do everything that you can to make sure that every single person in this nation is protected to the best possible ability of yours, then we may start trusting you, even though we know that accidents happen and people can get hurt.

Now, there was a statement that I made last night where we were talking about the duration and size of the fire test. I want to kind of amend that request I made last night. I said test to failure with the hottest burning substance on our nation's rails and

roads. I would like to amend that because it was brought to my attention that there are some things that are shipped that burn incredibly hot, but it isn't shipped in bulk and there is not enough to cause a pooled fire.

So I am going to amend that request to test as far as the duration and size of the cask test, and to test to failure, which means to breach to the open environment with the hottest burning substance that is shipped in bulk and can pool. Is that more clear?

And then without going over -- and I am not going to go point by point these 9 questions that you asked. I have already submitted it. But I want to state again for the public Pahrump record what Shundahai experts of the cask testing to promote public trust, secondly, and public safety, number one.

And that is, number one, we expect reevaluation of nuclear regulatory cask performance standards with meaningful stakeholder participation.

And if you want to get into what that means, I will be glad to talk to you in public and in private, or whatever, but I think or I am seeing that we have two different ideas of what meaningful means.

Number 2, again, meaningful stakeholder

participation from all affected areas, all proposed routes, and in the development of testing protocols, selection of test facilities, and the personnel involved.

Number 3, full-scale testing to failure of casks prior to NRC certification. In other words, if they don't pass the most rigorous tests that you can put them through, they do not get certified for use.

This would include every model that is on the road now and is subject to licensing coming up. Every model developed.

Whether it is on the road now, or you are thinking about putting on the road in the future, a randomly selected model -- let me take that back. I don't want you to take my words out of context. A randomly selected cask, built to complete specifications, from every model that would be licensed or is thought to possibly be on the road, in real world accidents and attack scenarios.

And again we have got to define what real world is, and I have my ideas and you have yours. Testing all possible shipping scenarios -- train, truck, barge, et cetera, and complete openness and transparency of everything that goes on and that affects the public.



And, number 5, public and media oversight of all tests.

FACILITATOR CAMERON: Thank you very much, Kalynda. Those are very good constructive comments.

And let's go to Jerry and then we are going to go to Commissioner Trummel.

MR. BIJOLD: Yes, going back to the initial transportation questions that I asked, and the Sheriff's comments were very well put, and we finally got it up here. But being an old retired military guy, I was under the impression that puncture tests in one case included a TOE missile that hit the cask of some type or some type of container, and I have not seen it, and I don't know where that test was. It was probably not an NRC test.

But what I would like -- and you probably know something about it. And also there were some other types of things when it gets to radioactivity and other things that I can't remember now, and I used to know many years ago.

But it would seem to me like part of that would go back to the Commissioner's comments that we have to find a way on the worse case scenario and take the most rural road we have in Southern Nevada somewhere, and go ahead and have a bad accident out

there, including a release.

And then go through a population center and take that release, because those are the two extremes when we talk about worst case scenario. The best case for the Sheriff would be out on that rural road somewhere with no one around, and the worst case would be coming through town someplace.

So to me that would be sort of the scenarios that we should know about, and what would happen with a real puncture test.

Now one of the gentlemen who is not here tonight, Tom Bucco, who had another thing, has done another test, or not a test, but he has projected what would happen if you dropped it in a river, and all of a sudden it goes down Lake Mead, it would take like hundreds of years -- and this is with a small projectile puncture, in order for Lake Mead to lose its contamination.

Well, that is sort of significant to us in Southern Nevada, I think. You know, things like that.

So I don't want to play worse cast, but I have this thing that is the better the planning the less we have to execute, and the better off it is.

So I don't want to belittle or belabor this, but I think it is really important, especially in

view of what has been happening over the last few years, and the people that are coming after us.

FACILITATOR CAMERON: Jerry, can you give the staff, if there is a study by this gentleman, Tom Bucco.

MR. BIJOLD: I have a copy and I will give it to you. It is a one-pager basically that says --

FACILITATOR CAMERON: Okay. Thank you for that. Rob.

MR. LEWIS: Talking about the puncture test, and we will take your second point as a way to define worse case, and that was very helpful in that regard, but when we were talking about the puncture test, the certification test that the NRC has for a puncture, it is not talking about a missile or a type of attack type puncture. It is more to simulate like a rail. It is a drop of 40 inches on to a mild steel bar that is sticking up.

And I am familiar with the other tests that you are talking about, and you are right, that they were not NRC certification tests, or even NRC sponsored tests at all.

There was some work done by a private company as part of their marketing for their casks, and storage casks in this case at the Aberdeen Proving

Grounds in Maryland, and they put a charge, a weapons type simulation and attached it right to the side of the cask, and exploded it, and tried to show what would happens, and we have more specifics about that with me here if you want to talk more about that, and we can do that off-line.

FACILITATOR CAMERON: Okay. I want to allow Commissioner Trummel to make a comment near the end of the meeting, and we are getting near the end of the meeting, but I think that Bob Halstead has an idea that he might want to suggest. Bob, did you want to put this on?

MR. HALSTEAD: Yes, I do. It occurred to me earlier that one of the things that they are doing is that they are doing a transcript of the meeting that they had in Washington and last night's meeting in Vegas, and this one, and the one they are going to have in Chicago.

And they have been pretty good in the past about getting these transcripts put up on their website, which is great for those of us who have computer access. But I don't know if this is something -- well, there is a public reading room here, right, because -- well, is there not an NRC public reading room?

We need to make some arrangement, whether it is at the library or the high school, and maybe a couple of places, but I think it would be very important as soon as the transcript of these meetings is done, to have a copy of the transcript air-freighted, and make sure that whoever has custody of it knows that it might be called something, because somebody might come in and ask for it, and they don't know the right name.

But it really would be useful I think for people here to hear that a lot of the same questions that have come up here are things that came up in the meeting in Washington and came up in the meeting in Las Vegas, and will probably come up in Chicago.

And they have done a good job like I said making this stuff available over the internet, but that is not always accessible to everyone. So having a hard copy of it would be a good idea.

FACILITATOR CAMERON: Let me go to Bill Brach and get a response to that.

FACILITATOR CAMERON: Bob, your suggestion sounds like a very appropriate one. I can't make a commitment as far as how, or where, or when, but let us take that back and see what we can do. And I appreciate that not everybody has either at home or at

other facilities access to the web if you will, or to the internet.

Let us take that back and see what we can do to facilitate having a hard copy available in the localities.

FACILITATOR CAMERON: I will write that up there. Okay. Grant, this is going to have to be real quick.

MR. HUDLOW: One of the things that I keep hearing from the public is that they don't trust the government, and from the government, I keep hearing that, well, we are trying to get the input. And there is a very simple way of doing that.

About a third of the Fortune 500 is doing that now, and these are called turnaround experts. Lee Iacocaca is one guy that you are all probably familiar with.

DOE had one guy that was a turnaround expert, and he was not in this Yucca Mountain, but in environmental cleanup and that was Al Long. He was an assistant secretary.

Leo Deaver was another one that was learning that and it comes under results management, the process of learning how to do that. Now how can you expect the NRC and the DOE, who in general don't

have those kind of people, and don't know what it looks like, how can you expect them to select somebody that has those kinds of skills.

Those kind of people have a technical background, and they can understand anything that anybody says to them, and sometimes it takes them a couple of weeks with people who don't have technical training to say something.

And they guarantee that they will run a test and when they get through, everything works, and it really works. I don't know how to get through to you that the State has the same problem. They don't have anybody that understands that either.

They don't have anybody that even knows what those people look like. I don't know how to get through to you to say that you need one of these kinds of guys in here.

And there are a whole bunch of these people at Proctor and Gamble. Proctor and Gamble will only hire engineers for their managers, and they only demand that all of these engineers get people skills or they bounce them.

And once they get the people skills of how to listen to people, and how to make things happen, and how to get things going.

FACILITATOR CAMERON: Thank you, Grant, and I think we have heard other suggestions from you in terms of managerial skills before, but thank you for that comment. And let's hear from Commissioner Trummel, and then Bill, I am going to ask you to close the meeting and final words, okay? Commissioner Trummel.

MS. TRUMMEL: I just had a couple of last comments. First, if you send us extra hard copies to my attention, I will make sure that I get a copy in the library, and probably John Pollack's office, and one in Amargosa, and so send us some extra copies, and I will personally make sure that they are distributed. That was an excellent idea and thank you very much for that idea, Mr. Halstead.

And secondly since there is such an interest and since most likely Yucca Mountain -- and I know that many of this room are not going to like that I am making this statement, but most likely the probability is that Yucca Mountain is going to eventually become a reality.

Otherwise, I doubt very much that the NRC would ever be holding a hearing in Pahrump, Nevada, if they didn't believe that it was going to become a probability.



And then I would like to see this testing conducted in Nye County, which is the area that will be receiving all of the shipments for this high level waste so that our citizens and the citizens of Las Vegas, and the State of Nevada, and anybody else who would like to travel, would be able to see these tests in progress and the results.

And so I am offering you that invitation, and I hope that you truly consider basing those tests here in Nye County. Thank you again for coming out there.

FACILITATOR CAMERON: Thank you for the offer, too, on the testing and the hard copy. Bill.

MR. BRACH: First, let me thank you for your offer to help us as far as a conduit if you will for providing hard copies and your offer to help distribute those to the library and to others. I thank you very much.

I want to thank everyone for coming tonight. I had mentioned at the very outset that personally, and I think I can speak for all of us here, I found and we have found that our meetings here in Pahrump to be very, very good, and from the standpoint of the expression of views, and the lack of hesitancy on all of our parts to provide us input, and that is

what we are here for.

And the spectrum of views, and the suggestions, and the considerations for us, whether it be in how we conduct the meetings, the tests we are considering, other aspects with regard to our regulatory roles and our responsibilities, speaking for all of us here, we take it very seriously, and I appreciate the time and the effort you have taken to give us the input and comments.

And I want to thank you all. I mentioned beforehand that the turnout tonight is markedly larger than the turnout in Las Vegas from the members of the public, and I thank you for taking the time this evening.

Everybody is busy, and I know that you all are, and I appreciate you taking the time to be with us tonight, and provide us your comments. I thank you very much, and I appreciate as well the facilities here for the conduct of the meeting. Thank you

(Whereupon, the meeting was concluded at 9:08 p.m.)

